

JUNE, 1953

YEARS  
PROGRESS

# METAL FINISHING

DEVOTED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS  
FOUNDED 1903

## elbow grease will keep that shine

But putting it there takes more than a dip in a tank. Actually it takes all of the items that checked in the illustration.

Steel parts are usually electroplated with three—copper, nickel and chromium. In preparing surfaces for these coatings—polishing, buffing, cleaning operations are used. All of these steps, in proper sequence, are essential to the final, lustrous finish.

Over it is the full-automatic plating conveyors, anodes and chemicals . . . the generators or tanks . . . the cleaners, wheels, buffs and compositions . . . or the plating process itself—for all these H-VW-M supplies *everything* from their complete list of products and services.

For example, H-VW-M offers an exclusive copper known as PR with Wes-X. The extreme levigation of this unique process completely eliminates buffering after the copper plate to a mere wipe, at the same time making it possible to require depth of nickel plate to a mere flash. Results?—sure! Results?—of course! Because H-VW-M knows, sells and services everything for your plating and polishing needs. So whenever finishing methods play a part in your production you'll find the one complete source for all your H-VW-M—and *Platemanship*.

**WHAT IS PLATEMANSHIP?**  
H-VW-M's unique combination of: the most modern complete laboratory for testing and development; the ability to provide complete equipment and supplies for every plating and polishing need . . . the complete background of knowledge and experience in every field of plating, polishing, cleaning and anodizing.



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# H-VW-M

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Analytical Control of Electroplating Solutions  
Principles of Inside Polishing and Buffing  
Effect of Chromium Plating of Steel on Fatigue Limit  
Colorimetric Determination in Plating Wastes  
First International Magnesium Exposition  
Practical Hint for the Polisher  
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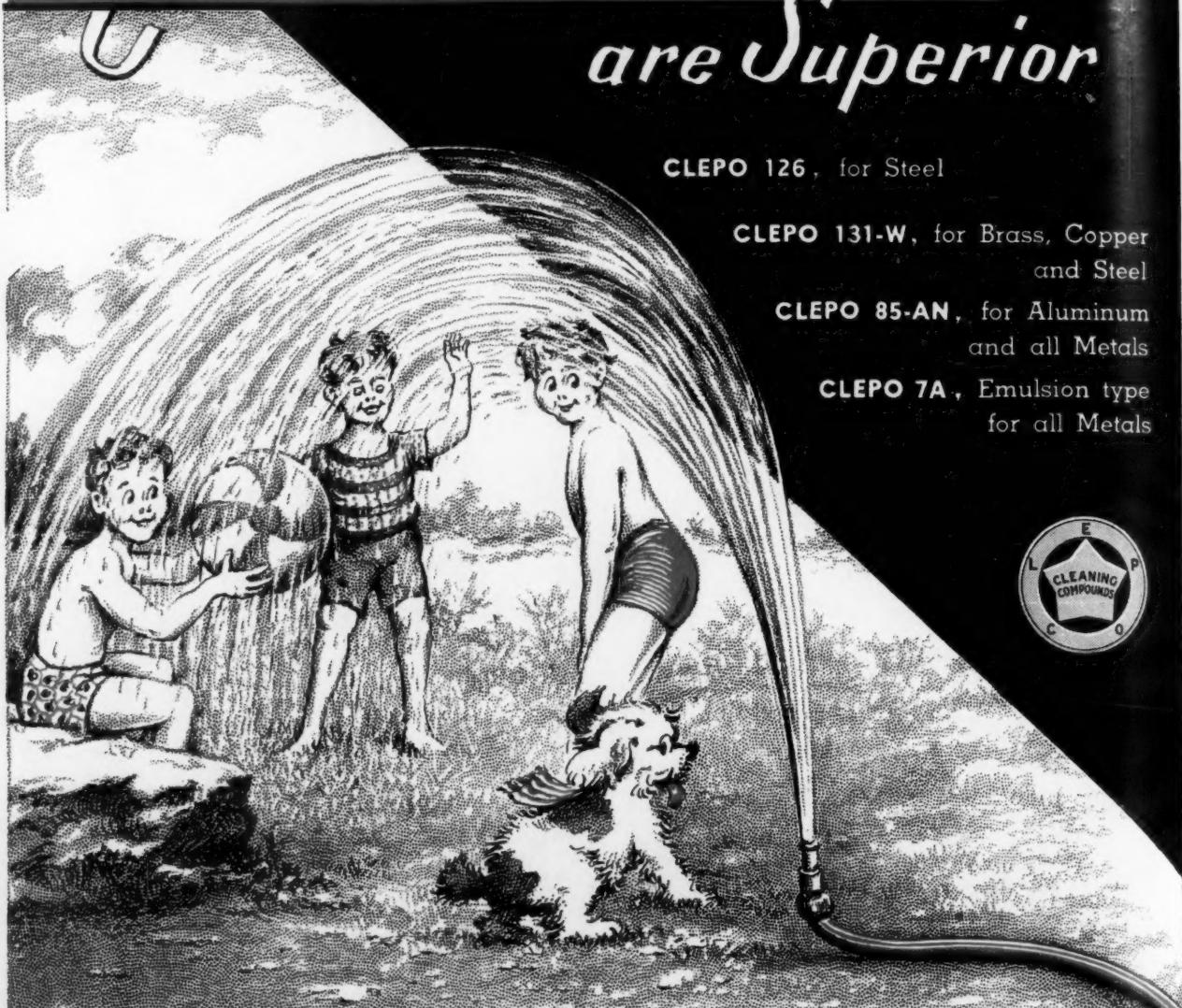


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### WARNING To Our Readers

It has recently come to our attention that a man misrepresenting himself as our circulation agent is operating in Ohio and making collections from amongst our readers. We wish to advise all concerned that METAL FINISHING or FINISHING PUBLICATIONS, INC. has no field circulation man, and all matters pertaining to subscriptions to our publications should be sent directly by mail to our Westwood office.

# METAL FINISHING

JUNE 1953

VOLUME 51 • NUMBER 6

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## COMING SOON

The methods and equipment used for quality production in a small custom chromium plating plant in California.  
 Condensation of a paper describing the laboratory work that has been carried out on the codeposition of tin and nickel from chloride-fluoride electrolytes.  
 Findings of experiments made to explore possibilities of developing a single metal protective coating for the steel internal parts of aircraft engines.  
 A description of the many uses of porcelain enameled steel, a metal protective coating whose use and versatility are much more widespread than commonly recognized.

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PUBLISHED 1903

DEDICATED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS

JUNE 51

NUMBER 6

JUNE 1953

# METAL FINISHING

## Fortieth In Philadelphia

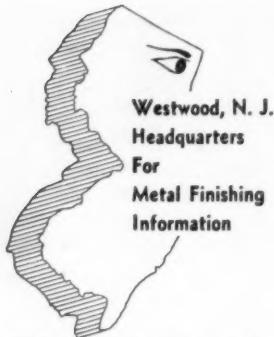
For the first time in twenty-one years Philadelphia will be the host city on June 15-18, when the *American Electroplaters' Society* holds its fortieth annual convention. The program which appears in this issue of METAL FINISHING should impress all platers and their employers with the benefits to be derived from attendance at the educational sessions, where at least twenty technical papers will be presented and discussed.

Philadelphia's landmarks of historical significance offer visitors a wealth of sightseeing enjoyment and arrangements have been made to keep conventioneers fully occupied. For diversion, there will be parties, golfing and a boat ride, none of which will interfere with the technical sessions, however.

Conventions too often are considered to be social get-togethers and, as a result, some employers are not overly enthusiastic about their metal finishing foremen, supervisors, chemists and engineers absenting themselves from work for a week. To such employers we would point out that the exchange of ideas helps to broaden the outlook of the finishing staff and the information brought back is often of direct and immediate benefit to the company.

Technical developments, of course, can be brought to the attention of industry through publication, but a good part of the application of metal finishing techniques is still in the nature of an art rather than a science. One cannot learn to paint a landscape from printed instructions so we urge all metal finishers to attend what promises to be an outstanding meeting. Such golden opportunities for a meeting of minds do not present themselves too often.

*Nathaniel Hall*



# A. E. S. TO HOLD 40th ANNUAL CONVENTION

## AT PHILADELPHIA, JUNE 15-18

FOR the third time the A.E.S. turns to Philadelphia as the site for a national convention. The last Philadelphia convention was held in June, 1932, during the depths of the depression. Today, with business in the finishing field generally booming, a large attendance is expected, based on hotel reservations already received.

For those arriving on Sunday, and to accommodate local members and their wives who may wish to register early, the registration desk on the mezzanine floor of the *Benjamin Franklin Hotel*, convention headquarters, will be open from 1:00 P.M. to 8:00 P.M. on Sunday, June 14. The registration fee of \$15.00 provides each registrant with a book of tickets for the various events.

As in the past, the convention will end Thursday night, June 18th, with the Annual Banquet. Table reservations can be made in advance at the Banquet Reservation desk beginning on Tuesday morning, June 16.

The opening session will be held in the Crystal Ballroom of the Benjamin

Franklin at 10:00 A.M. Monday, June 15. The Reverend Frank Mesle of Oneida Community will deliver the invocation. Dr. Samuel Heiman, general chairman, will preside and introduce the officers and other speakers. Edwin F. Ottens will represent the Philadelphia host branch.

*"Tomorrow's Challenge in the Delaware Valley"* will be the subject of a talk by J. Harry La Brum, president of the *Philadelphia Chamber of Commerce*. The Delaware Valley area, which includes Philadelphia, Camden, Wilmington, Chester, Trenton and other places in Pennsylvania, New Jersey and Delaware, is one of the world's greatest industrial areas.

Dr. William Blum, retired chief of the Electroplating Section, Bureau of Standards, and co-author with George B. Hogaboom of the book, *"Principles of Electroplating and Electroforming,"* will tell about *"Electroplating in Australia,"* based on his recent visit there.

A few old timers will remember the first A.E.S. Convention in Philadelphia held at the Bellevue-Stratford in June

1919. *Metal Finishing*, then *Metal Industry*, was represented by Thomas A. Trumbour who, along with George B. Hogaboom, are the only ones who have never missed an A.E.S. Convention since the group was organized in 1914. Otto W. Mott was president of the Philadelphia Branch at that time and acted as general chairman. Like this year, a feature of this convention was an afternoon steamer trip on the Delaware River. The entire society of 1919 numbered but 781 members.

The *Metal Finishing Suppliers' Association* (formerly International Fellowship Club) will sponsor *Fellowship Night*, an evening of entertainment on the opening day. August P. Munning of *Munning and Munning* is president of this group. They will also sponsor a luncheon meeting on Monday noon, June 15, at the Benjamin Franklin, for supply house executives and salesmen and a golf tournament on Wednesday.

The ladies program, under the direction of Mrs. D. R. Robson, will include sight seeing and shopping tours and a *Plato Party*, Hostess, Mrs. Joan T. Wiarda of *Metal Finishing*.



Franklyn J. MacStoker  
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1st Vice-Pres.



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Plant Visitation



Alfred H. Pope  
Publicity



Charles J. Wilmore  
Registration



I. Wm. Marcovitch  
Secretary and Program



William H. Trusdell  
Sergeant-at-Arms

## General Program

All events will be held in the Benjamin Franklin Hotel unless otherwise noted. Eastern Daylight Saving Time used throughout this program.

### Sunday, June 14

**10:00 a.m.**

EXECUTIVE BOARD MEETING. To be held in the Secretary's suite.

**2:00 p.m.**

METAL FINISHING SUPPLIERS' ASSOCIATION, INC. Board of Directors Meeting.

**8:30 p.m.**

BETSY ROSS ROOM

INFORMAL PARTY. For Convention earlybirds.

### Monday, June 15

**10:00 a.m.**

CRYSTAL BALLROOM

OPENING SESSION AND BUSINESS MEETING.

**12:00 Noon**

FRANKLIN ROOM

METAL FINISHING SUPPLIERS' ASSOCIATION, INC. Luncheon and Annual Meeting for suppliers and their representatives.

**12:30 p.m.**

SPEAKER'S LUNCHEON

**2:00 p.m.**

CRYSTAL BALLROOM

FIRST EDUCATIONAL SESSION. Admission by badge.

**9:00 p.m.**

CRYSTAL BALLROOM

INTERNATIONAL FELLOWSHIP CLUB OPEN HOUSE. Sponsored by the Metal Finishing

### Tuesday, June 16

**8:00 a.m.**

SPEAKERS' BREAKFAST.

**9:00 a.m.**

CRYSTAL BALLROOM

SECOND EDUCATIONAL SESSION. Admission by badge.

**12:30 p.m.**

BRANCH SECRETARIES' LUNCHEON. Room 206.

**1:00 p.m.**

INTERNATIONAL FELLOWSHIP ANNUAL GOLF TOURNAMENT, Merion Golf Club, Ardmore.

**2:00 p.m.**

CRYSTAL BALLROOM

THIRD EDUCATIONAL SESSION. Admission by badge.

**8:00 p.m.**

CRYSTAL BALLROOM

QUESTION AND ANSWER PERIOD.

### Wednesday, June 17

**8:00 a.m.**

SPEAKERS' BREAKFAST.

**9:00 a.m.**

CRYSTAL BALLROOM

FOURTH EDUCATIONAL SESSION. Admission by badge.

NATIONAL FEDERATION OF METAL FINISHERS, Annual Meeting, Franklin Room.

**1:00 p.m.**

OUTING ON THE DELAWARE RIVER. Steamer "Delaware Belle" leaves from Chestnut Street Wharf. Catered luncheon will be served aboard steamer. Buses will start leaving hotel at 12:45 for wharf. Will return about 7 o'clock. Admission by ticket.

**2:00 p.m.**

RESEARCH COMMITTEE MEETING. Aboard "Delaware Belle."

**7:30 p.m.**

ROOM 206

JOB PLATERS' DINNER. Sponsored by the National Association of Metal Finishers, Inc.

**8:30 p.m.**

Poor Richard Room

FILM: "CORROSION IN ACTION." Courtesy of International Nickel Company. Running time of film — approximately 1-1/2 hours.

### Thursday, June 18

**7:45 a.m.**

RESEARCH BREAKFAST.

**9:00 a.m.**

CRYSTAL BALLROOM

RESEARCH EDUCATIONAL SESSION. Admission by badge.

**12:00 noon**

NATIONAL FEDERATION OF METAL FINISHERS, Board of Directors' Luncheon and Meeting.

**2:00 p.m.**

CRYSTAL BALLROOM

FINAL BUSINESS SESSION. American Electro-platers' Society.

**7:00 p.m.**

CRYSTAL BALLROOM

ANNUAL BANQUET. Admission only by reservation ticket. In order to be served, your registration book must be exchanged for a special banquet ticket bearing a table reservation. Excellent food, top-notch entertainment, prize awards and dancing.

# Technical Program

(All Sessions in Crystal Ballroom)



Frederick Fulforth, Educational Committee Chairman, has many excellent technical papers ready for presentation at the technical sessions.

## Monday, June 15

### 2:00 p.m. First Educational Session

Chairman: Raymond F. Vines, Lancaster Branch.

#### Bright Gold Plating

By Edwin C. Rinker, Sel-Rex Precious Metals, Inc., Belleville, N. J.

#### Statistical Quality Control — A New Tool for the Electroplater

By Ezra A. Blount, Products Finishing, Cincinnati, Ohio.



R. F. Vines



E. C. Rinker



E. A. Blount



Dr. H. Brown



E. W. Hoover



Dr. H. B. Linford



E. F. Foley



Dr. W. R. Meyer

### 8:00 p.m. Question and Answer Period

Moderator: Dr. Abner Brenner,  
Baltimore-Washington Branch

Panel: Authors of Educational Session papers.

## Wednesday, June 17

### 9:00 a.m. Fourth Educational Session

Chairman, E. R. Bowerman,  
New York Branch.

#### An Electronic Thickness Gage

By Dr. Abner Brenner, National Bureau of Standards, Washington, D. C.

#### Thickness of Electrodeposits by the Anodic Solution Method

By C. F. Waite, King-Seeley Corp., Ann Arbor, Mich.

#### Testing Organic Finishes and Interpretation of Results

By C. O. Hutchinson, The Glidden Company, Chicago, Ill.

### 8:30 p.m. Film: "Corrosion in Action" (FRANKLIN ROOM)

Commentator, Dr. Thomas P. May, International Nickel Co.

## Thursday, June 18

### 9:00 a.m. Fifth Educational Session A.E.S. Research

#### The A.E.S. Research Program

By Dr. Donald Price, Oakite Products, Inc., New York, N. Y., Research Committee Chairman.

#### The Analysis of Electroplating Solutions for Major Constituents (Project No. 2)

By Dr. E. J. Serfass, Lehigh University, Bethlehem, Pa.

#### The Effect and Removal of Chromium from Nickel Electroplating Solutions (Project No. 5)

By Dr. D. T. Ewing, J. K. Werner, A. A. Brouwer and C. J. Owen, Michigan State College, East Lansing, Mich.

#### A Metallographic Study of Some Steels Used for Nickel Plating (Project No. 14)

By Dr. A. E. R. Westman, Toronto, Canada.

#### A Progress Report on the Development of a New Accelerated Corrosion Test (Project No. 15)

By W. L. Pinner, Houdaille-Hershey Corp., Detroit, Mich.



Dr. R. M. Wick



Dr. M. Quaely

# Abstracts of Papers

## Bright Gold Plating

By Edwin C. Rinker

This paper presents the industrial requirements and applications for bright gold plating. Principles, bath composition and plate distribution are discussed. Bright and conventional electrodeposits are compared with respect to corrosion resistance, abrasion resistance, smoothness and hardness.

## Statistical Quality Control — A New Tool for the Electroplater

By Ezra Blount

The principles of statistical quality control are finding increasing acceptance in the electroplating industry. The author discusses applications with respect to the variables controlled and plating plants employing such control methods. It is shown that a reduction in number of rejects as well as savings in metal can be accomplished.

## A Corrosion Study of Various Chromium-Plated Electrodeposits

By Henry Brown and E. W. Hoover

Results are presented for outdoor (industrial atmosphere) exposure, salt-spray and humidity tests on electrodeposits as foils and when plated on steel, nickel, copper, nickel-cobalt, nickel-iron, white brass with and without a final chromium plate and then are compared and discussed in terms of inherent and induced porosity.

## Iron Plating From an Alkaline Bath

By Edward F. Foley, Jr., Henry B. Linford and Walter R. Meyer

An alkaline iron electroplating solution is described. The composition of solution is given and the effect of varying the concentration of the constituents and the temperature on the cathode efficiency and operating characteristics are shown.

## Black Chromium-Base Electroplating

By Martin F. Quaely

Black chromium finishes which have good adhesion, can be easily applied and can be heated in high vacuums to 500°C., are required in industry. Three baths can yield deposits to meet these conditions as described in detail with regard to composition and operating conditions.



R. Dow



Dr. J. E. Stareck



Dr. E. J. Serfass



Dr. R. F. Muraca



R. S. Modjeska



W. L. Pinner

## Crack-Free Chromium — A New Process

By R. Dow and J. E. Stareck

A process for producing crack-free chromium electrodeposits is described. The plating characteristics of the process and the results of outdoor exposure and salt-spray corrosion tests on steel plated by the process, with and without undercoatings, are reported. Other physical properties are reviewed and illustrated.

## Cost Determination in the Industrial Chromium Plating Job Shop

By W. F. Walton and P. B. Lonsbury

The authors describe a method of price determination successfully used in an industrial chromium plating job shop. This method, based on a plating tank-hour charge, has variations to adapt it to the special conditions encountered in depositing heavy chromium coatings. The method described is adaptable to small or large operations.

## Stability of Ion-Exchange Resins Toward Chromic Acid Plating Solutions

By C. Frederick Paulson

A new cation-exchange resin which is resistant to forty percent chromic acid solutions is reported in contrast to earlier resins which were unstable above ten per cent chromic acid. A description of an ion-exchange unit for service with concentrated chromic acid solutions is given and operating data are presented. The stability of anion-exchangers is also discussed.

## A Study of Cyanide Decomposition

By E. J. Serfass, R. F. Muraca and Walter R. Meyer

This paper evaluates the factors responsible for the loss of cyanide from cyanide plating solutions and presents methods of minimizing these losses. The formation of carbonate, cyanate, ammonia and formate are discussed.

## An Evaluation of Carbonate Removal Methods

By R. Scott Modjeska

This paper presents a study of "freezing-out" and precipitation methods for the removal of carbonate from copper, silver, zinc, cadmium and brass cyanide plating baths. Evaluation of the method is based upon the type of deposit obtained after treatment and the difficulty of the treatment.



## CONVENTION HEADQUARTERS

The Benjamin Franklin Hotel which is located in downtown Philadelphia.

## A Further Study on the Effect of Abrasive Metal Polishing on the Character of Nickel Plate

By Walter L. Pinner

By means of photomicrographs, the character of steel surfaces created by various abrasive polishing procedures is shown and the effect of such surfaces on the quality of electrodeposited nickel is discussed with respect to smoothness, buffability and corrosion resistance. The beneficial effect of certain electrochemical treatments with respect to the removal of fragmented particles prior to plating is discussed.



W. F. Walton



P. B. Lonsbury



C. F. Paulson



G. Schore



A. Korbelak



Dr. A. Brenner

### Plating on Molybdenum

By A. Korbelak

A thin protective metal coating is required over molybdenum because of its poor oxidation resistance at elevated temperatures. Various methods used for the production of adherent electrodeposits over molybdenum are described. Industrial applications of electroplated molybdenum are mentioned.

### An Electronic Thickness Gage

By Abner Brenner

An electronic thickness gage based upon the skin effect is described. This method is applicable to a large variety of coatings on basis metals if the coating and basis metal differ in conductivity, e.g., silver on brass or lead on copper; the measurements are non-destructive.

### The Thickness of Electrodeposits by the Anodic Solution Method

By C. F. Waite

This paper describes the difficulty experienced using the hydrochloric acid drop test for chromium over copper. It also details a test unit which was developed for thickness measurements based on the principle of electrolytic solution or stripping of a definite area of plate by known amount of current. This method gives results accurate to plus or minus five per cent. Other applications of the method are discussed.

### Testing Organic Finishes and Interpretation of Results

By Carroll O. Hutchinson

The author describes over sixty properties of organic finishing materials used as a basis of evaluating these coatings. He also lists standard test procedures for most of these properties, together with essential control tests which are used. He presents a bibliography of valuable references on testing or-

ganic finishes and interpretation of results. This paper should be very valuable reference to those who have responsibility for organic finishes in addition to electroplated coatings.

### The A. E. S. Research Program

By Donald M. Price

The chairman of the Research Committee summarizes the accomplishments of the Research Committee during the past few years and stresses the value of research to the electroplating industry. Some of the problems facing the Research Committee are discussed.

### The Analysis of Electroplating Solutions for Major Constituents

By Earl J. Serfass

As a part of A.E.S. Project No. 2 research, dealing with the analytical methods for the determination of trace constituents in plating baths, and trace constituents in industrial finishing wastes, a program involving the study of analytical methods for major constituents in plating baths has been completed. Methods for the analysis of the major constituents of common nickel plating baths have been evaluated. These methods include procedures for the determination of nickel, boric acid, sulfate, chloride, etc. Methods for the determination, and cost per determination have been made on all of the methods used.



C. O. Hutchinson



Dr. D. Price

Evaluation of the presently available methods for major constituents have been made with a view towards presenting the plater with simple, rapid, yet precise procedures for the control of nickel and copper plating baths.

### The Effect and Removal of Chromium from Nickel Plating Solutions

By D. T. Ewing, J. K. Werner, A. A. Brouwer and C. J. Owen

This paper is one of a series on the effects of impurities and the purification of solutions for the electrodeposition of nickel. The effects of chromium as an impurity have been investigated and data are presented with the accompanying changes in such physical properties of the electrolytic nickel as adhesion, ductility and hardness. The effect of chromium from nickel plating on covering power and salt spray corrosion resistance, is also reported.

The rate of removal of chromium from



Dr. D. T. Ewing



J. K. Werner



E. R. Bowerman



C. F. Waite

nickel plating solutions is reported for reduction followed by precipitation and the differing effects of trivalent and hexavalent chromium are pointed out.

### A Metallographic Study of Some Steels Used for Nickel Plating

By A. E. R. Westman

A review is presented of the various types of steel — killed, semi-killed and rimming — which may be encountered by the electroplater in his work.

The micro-structures of a number of steels used in the industry and chosen more or less at random as subjects for examination are shown and discussed.

The results of a study of surface finishes having different modes readings are given. In this study 5° taper sections of the polished and etched surfaces were examined and photographed at various magnifications and under various conditions of illumination. In this way the structure of the steel immediately below the polished surfaces is brought out clearly. The characteristics of this structure in various samples are dealt with and interesting information regarding the effects of different modes of surface preparation is presented.

### A Progress Report on the Development of a New Accelerated Corrosion Test

By Walter Pinner

Based on the report of the Advisory Committee on Accelerated Corrosion tests, a program is described including plans for the fabrication, service exposure and accelerated corrosion testing of plated parts. In accelerated corrosion testing of plated parts, numerous accelerated test methods are described which will be preliminarily examined for correlation with service exposure results. The objective of the project is to develop an accelerated corrosion test which will correlate with outdoor performance.



C. J. Owen



Dr. A. E. Westman

# Ladies Program

**Sunday, June 14**

**8:30 p.m.**

**FRANKLIN ROOM**

**[INFORMAL] PARTY.** For convention earlybirds.

**Monday, June 15**

**10:00 a.m.**

**CRYSTAL BALLROOM**

**OPENING SESSION.** The ladies are invited to attend with the men and hear a good keynote speaker talk on a non-technical subject.

**2:00 - 4:00 p.m.**

**TEA AT THE WANAMAKER STORE AUDITORIUM,** 13th and Chestnut Streets. Talk by Mrs. Reba Miller, "Getting to Know Your Neighbors" (illustrated with dolls of all nations). Admission by ticket.

**8:30 p.m.**

**CRYSTAL BALLROOM**

**INTERNATIONAL FELLOWSHIP CLUB, OPEN HOUSE.** Sponsored by the Metal Finishing Suppliers' Association, Inc. Refreshments—Dancing. Buffet Supper served at 10:30 P.M. Admission by ticket.

**Tuesday, June 16**

**11:00 a.m.**

**AUNT ELLA SOCIETY LUNCHEON.** Sponsored by Oakite Products, Inc.

*Host: Dave Clarin*

Buses leave hotel at 11 o'clock for Drexelbrook Inn, where luncheon will be served at 12:15. Immediately after lunch, the party will proceed by bus to Longwood Gardens, returning to the hotel by about 6 o'clock. Admission by ticket.

**Wednesday, June 17**

**1:30 p.m.**

**OUTING ON THE DELAWARE RIVER.** Steamer



Members of the Ladies Committee have planned an interesting program of entertainment for visiting ladies. Members are, left to right, standing: Mrs. I. W. Marcovitch, S. Heiman, W. A. Reynolds, G. M. Long, F. Fulforth, E. F. Ottens. Front row: Mrs. C. E. Boerckel, A. G. Snow, D. R. Robson (Chairman), E. R. Lanahan, A. H. Pope.

"**Delaware Belle**" — leaves from Chestnut Street Wharf.

Catered luncheon will be served aboard steamer.

Plato Party on board.

The gifts are beautiful. Through the kind assistance of Oneida, Ltd., Oneida, N. Y. (intercession of our good A.E.S. friend Danny Gray), there will be a beautiful display of silverware.

The J. J. Siefen Co., 5657 Lauderdale, Detroit, Mich., will give each lady a piece of Coro jewelry.

The W. Green Electric Co., 130 Cedar St., New York City, will give each lady the traditional double deck of playing cards.

*Hostess: Joan Trumbour Wiarda*

Buses will start leaving hotel at 12:45 for wharf. Will return about 7 o'clock. Admission by ticket.

**Thursday, June 18**

**9:30 a.m.**

**HOTEL BREAKFAST IN THE GARDEN TERRACE.** Followed by a two-hour sightseeing trip through historic Philadelphia. Sponsored by Lea Manufacturing Co. Featured at the Breakfast will be the popular Ladies Educational Session. Subject: "*What Every Woman Should Know*" by Dick Crane of Lea. Admission by ticket.

**7:00 p.m.**

**CRYSTAL BALLROOM**

**ANNUAL BANQUET**

Admission only by reservation. In order to be served, your registration book ticket must be exchanged for a special banquet ticket bearing a table reservation. Excellent food, top-notch entertainment, prize awards and dancing.



Dave X. Clarin  
(Alias Aunt Ella)



Joan T. Wiarda  
(Plato Party Hostess)



Dick Crane  
(Speaker at Technical Session)

# METAL FINISHING SUPPLIERS ASSOCIATION PROGRAM

THE Metal Finishing Suppliers' Association, which is composed of the industry's manufacturers and distributors, will once again play a prominent role in the activities of the Annual Convention. The support of A.E.S. activities by the group is extensive throughout the year, but is especially evident and instrumental in the success of each year's annual meeting.

The first affair sponsored by the Association takes place at noon on Monday, the first day of the Convention, in the form of the annual *International Fellowship Luncheon*. This is open only to representatives of supply houses, and all firms selling to the metal finishing



A. P. Munning  
President, Metal Finishing Suppliers Ass'n

dancing, entertainment, and fun galore for all.

This year's annual *Fellowship Golf Tournament* will be held on Tuesday at the *East Course* of the *Merion Gulf Club*, which is one of the finest golf courses in the country. It has several distinctive characteristics in that the course has no blind shots or hidden dangers, no two holes are remotely alike in contour, it has no soft spots, and the two longest holes are the second and the fourth. Also, all three of the major events of the U.S.G.A. — the Open, the Men's and Women's Amateurs — have been played here at different times. Bobby Jones won his first U.S.A.C. here in 1924, the U. S. Open was played here in 1934, won by Olin

## OFFICERS OF THE METAL FINISHING SUPPLIERS ASS'N



Al Braun  
1st Vice-Pres.



Chas. Berry  
2nd Vice-Pres.



Manson Glover  
3rd Vice-Pres.



Tom Trumbour  
Permanent Sec'y.



George L. Nankervis  
Past Pres.

field are urged to have someone present for this meeting. It gives an excellent opportunity for a friendly and informal gathering with other suppliers and competitors, where mutual problems can be discussed openly. At the business meeting which follows immediately after the luncheon, there will be held the election of officers.

On Monday evening the MFSA will again sponsor its gala *Fellowship Open House Party*, open to all registrants. Veteran conventioneers will tell you to make this event a must on your program, for it is the opening gun in the week's social festivities. Refreshments,



Joe Duffy  
Golf Chairman

Dutra, and in 1950, won by Ben Hogan.

Remember, some handicap winners in the past have shot over 150 gross, so anyone has a chance. The long list of beautiful and useful prizes will be well worth shooting for. Don't forget, however that, as in the past, golfers are requested to bring their own clubs and shoes.

After the golf tournament the MFSA leaves you on your own for the rest of the week, with the hope that your stay in Philadelphia will be a pleasant one, and the suggestion to attend the technical sessions, which will be helpful to you.

# My Experience with Analytical Control of Electroplating Solutions

By George B. Hogaboom, Consultant, New Britain, Conn.

DUE to success in brass plating in a job shop, a position was offered me in 1905 to take charge of a plant where silver was plated on glass and china, the so-called "silver-deposit" ware.

A few years previously my contact with that class of work had shown what was thought to be the method of production. The method of preparation of the work had, however, changed. What had been observed was the Scharling process of covering the entire article with silver. This process was patented by John H. Scharling (U. S. Pat. No. 472,230, April 5, 1892). It consisted of pouring a solution of silver nitrate, to which had been added a reducing agent, over the glass or ceramic article until a metallic film covered the entire surface. The article was then plated in a silver cyanide solution high in metal e.g. 6 oz./gal. and a low free cyanide so that a layer of silver was electrodeposited without any removal or distortion of the film. The time of electroplating was sufficient to deposit a thickness of silver approximately 0.025 inch. That required a continuous plating of about 24 hours or more. Several times during the plating operation the article was taken from the bath and the roughness filed away so that a smoother final coating could be obtained. It was not possible, at that plant, to silver plate the required thickness without having a rough deposit, as is the practice today. Chemical control of the solution was unknown and the method of testing the solution was the same as described in "The Plater In 1903" [Metal Finishing, 51 (1953)]. After the required thickness of silver was deposited, the article was sand bobbed and tripoli buffed. A design was then painted on by hand using a resist to withstand nitric acid. Etching away of the unprotected parts followed, care being used to prevent, as far as possible, seepage of the nitric acid under the protected parts so that the mirror surface next to the glass would not be discolored. The design was subsequently buffed to a high finish and the silver deposit engraved with a decorative design. The finished article was colored to a high lustre. During the buffing and etching operations considerable care and skill had to be used to prevent the silver from being torn away or

removed from the surface of the article. There was no adhesion of the silver to the basis material, glass or ceramic.

About 1914, Mr. Scharling conceived the method of making a silver paint for decorating the glass or ceramic article with a design. The silver paint consisted of very fine metallic silver powder, a flux and a suitable oil vehicle, such as is used in general decoration of glass or ceramic with a colored design. The glass or ceramic was then "fired" in a muffle type furnace so that the oils would be volatilized and the flux would act upon the silver to produce a good bond with the base. The story of ascertaining a suitable fineness of silver, a good flux that would not cause the silver to color the glass, and a vehicle of oils that would readily volatilize and not leave a residue, should be described in a more detailed article. The problem was not easy, but it was overcome as evidenced by the "silver-deposit" ware that can be seen in many stores.

The method used in the plant where a position in charge of the electroplating was offered, was the "firing" method. My recommendation for the position was due to the insistence that if good brass plating could be done then there was confidence that "silver-deposit" could be successfully accomplished. The firm was in the position of having to produce good work or going out of business.

## One Rheostat for the Whole Line

The plating equipment consisted of ten-10 gallon glass battery jars, an Eddy generator, a lead accumulator, called a storage battery, and one rheostat for the whole line. It was proposed to make whatever changes needed but it was deemed more advisable to work with the present equipment until it was learned what changes or new equipment was necessary.

The articles plated were glass and ceramic teas, sugars, creamers, vases and general tableware. The silver deposit was very rough. It was plated for approximately 20 hours during which time each piece was taken out of solution and the rough silver coating

filed by hand in an endeavor to obtain as smooth a deposit as possible.

By installing temporary "home made" rheostats a better deposit was obtained, although not perfect. It was possible to deposit the required thickness of silver, approximately 0.020", without removing the article from the solution and filing. It was however necessary to smooth the roughness after plating.

Within a month it was decided to do away with the 10 gallon glass jars and install large tanks. Two wood tanks, pitch lined, holding about 200 gallons with banjo type rheostats with additional storage batteries were obtained. The job now was to make the new silver solutions. Silver cyanide had not as yet been made available, so the solutions were made with chloride of silver. There was no distinction between sodium and potassium cyanide, so just "cyanide" was used. Later it was learned that the products were a mixture of sodium and potassium cyanide. This was learned one night when the temperature of the plating room went below the freezing point, whereupon the carbonates that had been built up in the solution crystallized.

The formula for the silver solutions was that which had been learned while working in a large silver plating plant. It was thought advisable to follow the instruction in Langbein's book. The method was to use sufficient silver chloride so as to have approximately 3 oz. of silver per gallon and then add the stated weight of cyanide but, further on, the instructions were to add cyanide until the solution was clear and had a wine color. It was not known that a flocculent material, now known to be an iron salt, would not be dissolved, consequently too much cyanide was added. There were no published methods for determining the "free" cyanide content of a plating solution.

The first batch of work was ruined, the solution gassed violently and experience indicated that there was an excess of cyanide. The hopes of successful operation faded. That night the windows were opened, a ball of cotton applied to my nose and hydrochloric acid was added until the precipitate dissolved slowly. It was not believed that hydrochloric acid would harm the solution as a chloride salt had been used in making the solution.

The batch of work that came out of the solution the following day showed a considerable improvement over the work produced in the glass jars, although some smoothing of the deposit with a file was necessary prior to sand bobbing and buffing.

It was noted that the silver deposit was smooth for several hours, and roughness did not begin to appear until after about ten hours plating.

An acquaintance who taught pharmaceutical chemistry in a night school had been discussing analyses of some compounds, but he could not offer any suggestion as to why the deposit of silver was reasonably smooth for a period of time and then started to become rough. It appeared that, if the constituents of the solution were kept at a constant value and the electric current correctly controlled, the deposit of silver should be smooth during the entire plating operation.

#### Meters on Both Tanks!!

First the electrical conditions were studied. The Eddy generator supplied the current to the plating solu-

tions and also charged the storage batteries, or lead accumulators, at the same time. During the night (we worked to 6 P.M. in those days) only the storage batteries were used. As there was a voltmeter and an ammeter on both the plating tanks, the current was adjusted when the change to the accumulators was made. While some improvement was noted in the character of the silver deposit it was not entirely satisfactory, even though the management of the plant thought that good work was being produced. The encouragement received was of great help, yet it was believed that better work could be produced.

The libraries of Newark and New York City were searched for any literature on the chemical control of a plating solution but, even with the assistance of patient librarians, nothing was found. The Newark city chemist and the instructor at a night school were consulted without receiving any indication of what could be done.

It was decided to request assistance from all the chemists who would listen to the problem and every one endeavored to offer some suggestions. The head of the chemical department of Columbia University, the chief metallurgists and chemists of all the metal refining laboratories were approached. Of all the same question was asked, "how can a silver plating solution be controlled so that a smooth, heavy silver deposit of approximately 0.020" may be obtained." The answers invariably were not helpful and the suggestion was often made that the articles be taken out of the solution and scratch brushed. This had been tried, as the process had been seen in a large plating plant. There was known at that time only one plant doing similar work and the problem was the same, but no discussion of the methods or solutions used was encouraged by the plater.

At last, the secretary of the Chemists Club in New York City, who operated a consulting laboratory, listened patiently to the problem and stated that he was interested in young men trying to improve the methods used. If a visit would be made to his laboratory on the following Saturday he would endeavor to assist. On that day the visit was made with a sample of the two silver solutions.

The advice was to precipitate the silver with a small amount of 80 mesh zinc powder. The precipitated silver was to be well washed with distilled water and then dissolved in nitric acid. This probably was a well-known process in the metallurgical field but, to my knowledge, had not been used for controlling an electroplating solution. The well-known "Liebig" method for obtaining the cyanide content of the solution was also suggested. Probably, as stated above, the difficulty in obtaining assistance was the request as to the amount of silver and that of "free" cyanide. It was not until several years later that other methods for obtaining the metal content of a silver solution were learned. As a matter of interest, the instruction took only a few hours and a charge of \$100.00 was made, which came out of my own pocket.

After obtaining the necessary glassware, the silver solutions were tested for metal content and "free" cyanide. The helpful carbonate addition was not known. The optimum concentration of either metal or free cyanide was not in any of the available literature.

The best instruction was published in "A Practical Guide for the Gold and Silver Plater" by William H. Wahl, Ph.D. (1883). In the chapter on silver plating, the formulas of the silver solutions of two Connecticut silver platers is given — the Meriden Britannia Co. and the William Rogers Manufacturing Co., of Hartford. The concentrations of metal and potassium cyanide differed in these formulas:

The Meriden Co. — potassium cyanide 12-16 oz./gal. with a silver content of 4 oz. as silver chloride; The Rogers Co. — potassium cyanide 12 oz./gal. and 3 oz. of silver. A not very helpful statement was, "*Where these baths deposit their metal rapidly without the aid of electricity, it is a proof that they are too rich in cyanide or what amounts to the same thing, too poor in silver.*"

It was necessary to make frequent, almost hourly, estimation of the free cyanide, even during the night, since the work was electroplated approximately 20 hours and often longer, because the deposit had to be sufficiently thick to engrave with monograms and for ornamentation. It had been read that solutions high in metal content permitted a more rapid deposition of silver. The silver content of the baths was gradually increased but it was also found that the free cyanide had to be increased. The solution was brought to 3 oz. of silver, as metal, and 3 to 3.5 oz. of free cyanide per gallon, where the idea of "free" cyanide is not known. Wahl (*ibid*) stated that, "*Where the bath became impoverished it is revivified by additions of equal parts of potassium cyanide and silver salt.*" From the estimation of the metal and cyanide content of the solution this was found to be incorrect and it was determined that, under the conditions then employed, the addition of cyanide alone was sufficient to restore the solution.

#### **Faraday Could Have Helped**

The effect of the relation of the area of the anode to that of the cathode, when the free cyanide was kept at a constant value, had a marked affect on metal content of the solution. At the same time it was noted that the pressure used, as recorded by a voltmeter, influences the surface condition of the anode. Due to the lack of knowledge regarding the rate of deposition according to the number of amperes used, the amount of metal deposited in a given time could not be determined. This was in 1905 and the use of an ammeter in electroplating was hardly known, but there was one in the line for both of the silver solutions. There was no one known, however, with whom notes could be compared and discussed.

It was quite impossible to calculate the cathode area as the designs in the glass and ceramic ware were quite different, some highly ornamental, others just a few lines. As a jug, bottle, cocktail glass, tea or coffee pot had approximately the same overall area and the displacement in the silver solution was practically the same there was no way by which any definite cathode area could be ascertained. The surface of the anodes were carefully observed. The anodes were 6" long and 2.5" wide. They were hung on iron wires and placed where it was evident that more silver deposit was needed. The adjustment of the anodes was made according to the shape and ornamentation. The results

of the tests made with anode area and current controlled by a voltmeter was described in *The Metal Industry*. If the surface of the anode was bright, the indication was that the anode area was too small; if the "galvanized iron" effect was observed, it indicated that the anode area was too large. The observation of the anodes was practical as the metal content and free cyanide were kept, as stated above, at approximately a constant level. Due to the extreme variation of the cathode area in the beginning of the series of tests and observations, it was found that the silver content of the solution increased. That was found an advantage for the class of work done and the final silver concentration, from which the best results were obtained, was approximately 6 oz. of metal with a free cyanide of about  $7\frac{1}{2}$  oz. per gallon. The operation of this concentration of solution, with a close observation of the effect of the relation of anode to cathode area on the corrosion of the anode, resulted in a maintenance of the metal content of the solution at approximately the same level for several years. During this time the free cyanide content of the solution was maintained by daily analysis. The deposit of silver of at least 0.020" was obtained within the 20 hours allotted. The deposit was smooth and required very little buffing.

The thickness of the silver deposited in later years, or more precisely at the present time, is much less than in the early years of silver deposit industry. At present, a deposit of not more than 0.003" is considered sufficient. In a controlled solution this can be accomplished in approximately three hours. The solution used contains about 5 oz. of silver and 6 oz. of free cyanide per gallon.

In the Fall of 1910 the position of instructor of the classes which were attended in 1902 was accepted. A better equipped plating outfit was obtained but it was believed that better service would be given the students if they were taught methods for control of all plating solutions. Again the literature was searched for methods of chemical analysis for nickel, copper, brass and zinc solutions. The only information that was found was in that excellent book, "Electroplating," by Barclay and Hainsworth, a copy of which was not available in this country until late in 1913.

In the meantime an appeal was made to all then known sources, as was done in ascertaining how to control a silver solution, with disappointing results. Again the question asked, "how to control a plating solution," no doubt had a deterrent effect on the answers received. The education of the platers at that time was practical only, and did not include any chemistry. This was the same for the writer, as his education was limited to the lower grades of what is now known as a "grammar" school.

#### **A Course in Chemical Analysis**

Fortunately, in June 1913, a summer course of six weeks was offered at Columbia University for the analysis and recovery of filings, sweeps, etc., of silver and gold shops. This course was in the School of Mines, assay department, under the instruction of the late Prof. Everett J. Hall. As silver deposit work was of a seasonal nature, arrangements were made so that, by taking care of the necessary production early in the morning and later in the evening, it was possible to

attend the course offered. Due to my previous experience with sterling silver, it was possible to render Prof. Hall assistance in one of his problems at a sterling silver plant, where he was acting as a consultant on recovery methods for silver scrap and residues. He then stated that the course offered was not what was desired and asked what further assistance could be given. The answer was methods of control of all electroplating solutions. Prof. Hall had never been in a commercial plating room where the several different solutions were used. He advised, however, that samples be obtained of solutions that were considered to be in good operating condition. This was accomplished through the students in the electroplating course in the night school in Newark, N. J. At that time the book mentioned above was not known and consequently methods had to be devised. The instruction received was almost personal and lasted for eight weeks during which time different methods were developed and practiced. The instruction, due to the lack of education, had to be almost elementary, in fact it was. While the several methods were patiently worked out by Prof. Hall, the knowledge gained needed considerable practice, which at that time was not possible, as there were no solutions available to observe the effect of control methods as there was previously with a silver solution. The platers in shops where the several solutions were in operation showed little interest in control methods, since their "rule of thumb" practice resulted in sufficiently good work so that the job could be held.

The National Electro Platers Association (later the American Electroplaters' Society) had been formed but the talks on control of electroplating solutions were received with considerable skepticism.

Again, fortunately, a position was offered in a large builders hardware manufacturing concern and accepted two weeks after the course under Prof. Hall had been completed. A few months previously a chemical laboratory had been installed under the supervision of Joseph C. Andrews who, at that time, had no definite knowledge of electroplating solutions. His presence and attempts to assist in the plating department were resented, and it was due to this condition that the position was offered and which, when the personnel of the laboratory was seen, was accepted.

All the methods taught by Prof. Hall were turned over to the laboratory and a detailed study was made of their application of chemical control of the plating solutions. The first one studied was the cyanide brass solution. The total metal content, the relation of the copper to the zinc content, the free cyanide, carbonates and all additions that were included in the formulas in the literature were thoroughly investigated. While tests were made in the laboratory, production had to be carried on in a 1000 gallon solution operated by a new full automatic plating unit which had been developed in another division of the concern. Because of the inability to consistently produce satisfactory work, both as a result of lack of adhesion of the deposited metal and the non-uniformity of the color of the brass coating, the equipment was considered non-adaptable to the production of consistently good work.

The records of a weekly, and sometimes daily, chemical analysis of the brass solution enabled the plotting of a curve from which a good working solution could

be obtained. It was also necessary to observe the corrosion of the anodes and to ascertain the relation of the zinc to the copper. The result was to prove that the full automatic equipment was not at fault but the trouble was due to the solution and the anode composition. Due to the success obtained, a larger full automatic plating machine was constructed from which consistent results were immediately obtained.

There was a full automatic plating machine for the cyanide copper solution. The same assembly of data on the metal content, free cyanide and carbonates in the solution, as well as the relation of the anode area, proved that the lack of chemical control of the solution was the basis of all poor work. It was also learned that the distribution of the electric current throughout the automatic plating machine was of prime importance. The uneven current distribution due to the lack of rheostat control on both the cleaning units and the plating tank were found to be a cause of non-adhesion of the deposit and blistering. When the electrolytic cleaning tanks were used as electrodes, a residue of decomposed material formed on the sides of the tank and prevented the passage of the desired amount of current unless the voltage was increased. Invisible films were formed on the work which prevented a good deposit of metal.

The analytical control of all the plating solutions on a definite schedule showed the change in the concentration of any of the components of the solutions. From that study it was possible to maintain the correct concentration of the solution by additions between the periods of analysis and, therefore, large additions that had a tendency to upset the solution were avoided.

Later, in another plant operating 36 tanks each containing approximately 320 gallons of silver solution, the same methods as outlined above were followed. Previously analysis were made only when the solution was not working correctly. This resulted in a high percentage of rejects whereas the maintenance of the silver plating and strike solutions at as near a constant composition as possible resulted not only in a decrease in rejections but also in an improved character of deposit and a higher production than thought possible without increasing any of the equipment. There were approximately 5000 ounces of silver deposited each day over a period of nearly two years *without the addition of any metal salts*. In a subsequent position this system, used mainly for nickel plating, permitted the use of high purity nickel anodes instead of shot nickel in celluloid containers. In any plant there are always some amusing incidents and this place was no exception. It was not permitted to make any changes in the plating room until after the conditions had been studied for one month. The main trouble was dark colored nickel deposits. At the end of the waiting period, a 420 gallon nickel solution was made with single nickel salts. Formerly double nickel salts had been generally used. The first batch of work plated was "black as your hat." That was quite disconcerting as my mission was to obtain a good white nickel. Investigation disclosed that the single nickel salts had been purchased from a copper refining concern and that some copper sulfate had been "shoveled" in the barrels and, worse,

(Concluded on page 102)

# Principles of Inside Polishing and Buffing

By Edwin F. Doyle, Barker Bros., Inc., Brooklyn, N. Y.



THE following paragraphs in general, are concerned with the use of muslin (cotton cloth) buffs for inside polishing. The use of felt wheels and bobs for this purpose will be covered briefly near the end of the article. Definitions of polishing, buffing, set-up wheels, and other terms relative to polishing, will not be discussed. The term "polishing" will be used throughout in its broad sense and will apply to any grinding, polishing, or buffing operation.

Cloth buffs or bobs can be used to good advantage on almost any item that requires grinding, polishing, or buffing of inside contours. Cloth, being very flexible, will conform to the surface better than any other material. This allows the use of a single inside polishing buff on an inside surface that may vary somewhat in its shape. For example, a round end Goblet buff will fit itself to variety of contours, a few of which are shown in Fig. 1.

Cloth is an excellent material to hold either glue and abrasives or compounds, including greaseless. With glue and abrasive, a substantial head can be built up that is resilient and flexible, yet will do a fast, efficient grinding job. Compounds adhere well to the cloth, yet the ravelling allows the worn out compound to be discarded. It will usually wear in such a way as to distribute an even pressure over the entire surface, giving a more uniform job.

One of the few limitations for a cloth bob is minimum size. Sufficient diameter is necessary to securely fasten the cloth together. For smaller diameters than are feasible in muslin, felt bobs can be used. The minimum size for cloth depends on the type, shape, and construction of the buff. Goblet buffs are standard from 2" to 6", the minimum size being 2". The Taper buff, however, is tapered to approximately 1" at the small end. The second limitation is length of the bob. A sufficient portion of the bob must be supported by the spindle or else the buff will fall away from the work. It is not practical to make, for example, a Taper buff longer than 3½". The majority of buffs for inside polishing should be used on a tapered lathe spindle or screw spindle. A straight arbor shaft that requires a flange and nut cannot be used.

## Buff and Bob Speeds

The speed in surface feet per minute necessary for polishing and buffing operations will be proportional although smaller than that required for regular outside operations on similar material. The reason the speed must be slower is because a greater percent of the buff is in contact with the work at all times. This hinders proper cooling of both the work and the buff.

Another factor governing the speed is that the actual working or polishing surface varies in diameter at different parts of the buff. For example, a 3" Goblet buff will have a very slow surface speed near the center while having a satisfactory speed near the edge. This must be taken into consideration in selecting the proper shaped buff for inside polishing.

In using buffs of this type, the work should be moved in such a way as to bring the outer portions of the buff in contact with as much of the work as possible. This can be accomplished by using a buff slightly smaller than the diameter of the work, or by having the axis of the work at a different angle from the axis of the buff spindle, as shown in Fig. 2.

The best technique would be determined by the shape of the buff and the item to be polished. To determine how fast the buff may be run, consider the following factors:

1. Kind of material to be polished. Will it conduct heat rapidly or slowly.
2. Size of the article. Thin objects cannot carry the heat away as rapidly as thick objects.
3. The kind of finish desired. Some materials may discolor at relatively low heat. If this is no objection, then it is not a consideration for determining speed.
4. The composition or the glue used. Excessive heat will cause compositions to deteriorate or be thrown off before it should be. This is both wasteful and results in a slower polishing operation. The same applies to glued abrasives. Both compositions and glues vary in the maximum temperature they can withstand.

In buffing with composition, it must be remembered that an inside polishing buff cannot fray out and discard, or throw off, the used compound, consequently,



Figure 1. Variety of contours which may be polished and buffed with a round end Goblet buff.

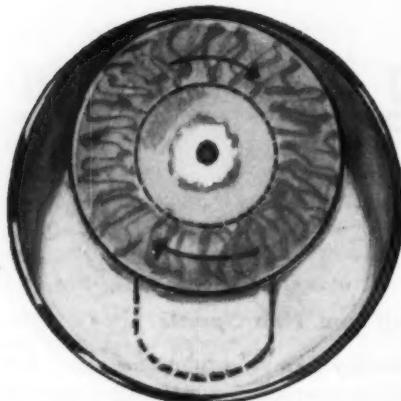


Figure 2. Two methods of using a Goblet buff on inside surfaces.

there is a tendency for the buff to glaze on the surface. The buff has to be raked and new compound applied more frequently than in outside polishing. If too hard a cloth is used in the manufacture of the buff, it will glaze up rapidly. For this reason, if a faster or coarser operation is required, the type of composition must be changed, not the material in the buff.

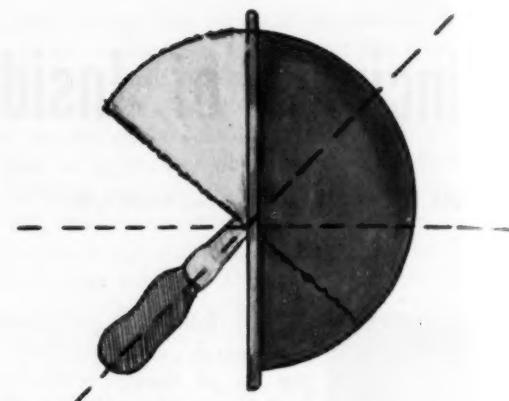
The ends of the thread, not the side of the cloth, should be used for polishing. The thread ends can absorb and hold the abrasive much better than the thread sides. Better pressure distribution can also be obtained from the ends of the thread. The natural ravelling of the thread will help to discard the used compound. If it is not possible to polish with the thread ends and the sides of the cloth must be used, allowances must be made to produce satisfactory results.

#### *Many Shapes Are Available*

Many shapes of buffs can be manufactured. The exact shape of the work is not essential. Pressure will form the buff into the contour of work. Changing the angle of the axis of the buff spindle with regard to the work, will shorten or lengthen, the arc polished. A Taper buff on a flexible shaft can be used to do a polishing operation on the inside of an irregular shaped casting simply by turning and twisting the buff into different positions.

Some of the most common shapes are the Round End Goblet buff, Square End Goblet buff, Taper buff, and Cylinder buff (Fig. 3). Small diameter polishing wheels in varying thickness are also used extensively. The latter are used almost entirely with greaseless compound or glue and abrasives.

As examples of the versatility of these small shaped buffs, a listing of a few of the many shaped articles that are polished by these methods follows:



**ROUND END GOBLET BUFF:** Dies and molds with spherical inside contours, ladles, spoons, loving cups, kitchen ware, castings, welded and fabricated articles, plastics, reflectors.

**TAPER BUFF:** Dies, molds, castings and forgings with many different shape inside contours, tapered cups or cone-shaped stampings.

**CYLINDER BUFF:** All straight inside walls that require polishing.

**SMALL POLISHING WHEELS:** 1" diameter and larger. Removing welds, flashings, deburring, internal seams — actual grinding and removing metal from inside surfaces.

The above are only a few uses, intended to give some idea as to the type of contours that can be polished. A general classification of these types of contours might be as follows:

Surface	Buff
Inside spherical	Round goblet
Inside corners (Where bottom & sides meet)	Square end goblet
Bottoms	Square end goblet
Inside recesses	Taper, goblet or small polishing wheels
Inside irregular contours	Taper or goblet
Inside cylindrical	Cylinder buffs
Inside taper	Taper buffs

Most items would fall into these categories. Selection of size would be dependent on size of work. Often it is advisable to experiment with several different shape or size buffs before deciding on the best one.

Selection of composition is by experience. The type of finish desired is the most important consideration.

For articles that require sizes smaller than the minimum limitation on muslin buffs, felt is very satisfactory.

(Concluded on page 102)



Figure 3. A few of the common types of buffs for internal contours.

# Colorimetric Determination of Cyanide, Cyanate, and Thiocyanate in Plating Wastes

By J. M. Kruse and M. G. Mellon, *Purdue University, Lafayette, Ind.*

**I**N a recent paper<sup>3</sup> methods for the determination of complex cyanides and for cyanide in the presence of thiocyanate have been described. These methods, however, are unnecessarily complicated for cyanide in the absence of cyanide complexes and thiocyanate. In this paper, therefore, a simplified procedure is given for the determination of cyanide alone. This procedure is applicable when thiocyanate is absent and only free cyanide is to be determined. In addition, procedures for the determination of cyanate and thiocyanate are proposed.

Thiocyanate and cyanate are both intermediates in the decomposition of cyanide. Also, both these ions may be found in plating wastes and as intermediates or side products of reactions. For these reasons methods for the determination of these ions appears desirable.

For the macro determination of both thiocyanate and cyanate several useful methods are known. Among these are the use of silver nitrate for the titration of both thiocyanate and cyanate; the use of iron, mercury, and cobalt to form colored complexes with thiocyanate; and the use of a copper-pyridine system<sup>8</sup> for the colorimetric determination of cyanate. In addition, the pyridine-benzidine<sup>1</sup> and pyridine-pyrazolone<sup>2</sup> reagents have been shown to be applicable to a thiocyanate concentration of less than 1 p.p.m.

Of the methods mentioned only the pyridine-benzidine and pyridine-pyrazolone systems have the desired sensitivity of 0.1 to 10 p.p.m. Unfortunately, these two methods suffer from the disadvantages of unstable color systems, unstable reagents, and considerable time requirement for color development. Also, cyanide will interfere. In the case of cyanate, no method more sensitive than 50 p.p.m. could be found in the literature. For these reasons, new methods for the determination of thiocyanate and cyanate were developed.

Thiocyanate is determined with a copper-pyridine reagent. Although a similar system has been used for this determination by Spacu,<sup>7</sup> the maximum sensitivity previously attained was 20 p.p.m. The present method

is sensitive to less than 0.5 p.p.m. thiocyanate, and by boiling the sample the sensitivity can be increased still further.

The only interferences are iodide, mercury, and more than 10 p.p.m. of cyanide, complex cyanides, or nickel. The iodide can be removed with carbon tetrachloride in the form of iodine; the cyanide or complex cyanides can be removed by boiling of the sample. The cations can be removed by means of ion exchange or by precipitation of the hydroxides. More than 50 p.p.m. of magnesium also will interfere, but it can be removed in the same manner.

Cyanate is determined with a pyridine-pyrazolone reagent. Although this is the same reagent used for the determination of cyanide and thiocyanate, the conditions for the cyanate color development are quite different. The color is formed very rapidly and is stable for several hours. The interferences are silver, copper, zinc, and ammonia, and, of course, thiocyanate and cyanide. All of the cations are removed by ion exchange. Actually, the color formed by ammonia is so intense that the reaction has been used as a basis for a new method of determining ammonia.<sup>4</sup>

## Determination of Cyanide

The cyanide sample is buffered at pH 6.8 and the color is then developed directly in the sample with the pyridine-pyrazolone reagent. The color systems follows Beer's law for 0.04 to 2 p.p.m. cyanide and is stable for about 1 hr. after a period of color development.

### 1. APPARATUS

1.1. Spectrophotometer, or photoelectric filter photoelectric filter photometer transmitting at 620 m $\mu$ .

1.2. Volumetric flasks, 50-ml.

### 2. REAGENTS

2.1. Buffer solution, pH 6.8. Add 9.0 g. of  $\text{KH}_2\text{PO}_4$  and enough  $\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O}$  (about 11.8 g.) to give a pH of 6.8 to 900 ml. of water. Dilute to 1 l.

2.2. Chloramine-T, 1 per cent. Dissolve 0.20 g. of

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chloramine-T in 20 ml. of water. The solution should be freshly prepared each day.

2.3 3-Methyl-1-phenyl-5-pyrazolone. The pyrazolone is recrystallized twice from 95 per cent ethanol, and can then be stored for months in a dark bottle.

2.4 Bis-(3-methyl-1-phenyl-5-pyrazolone). Dissolve 17.4 g. of recrystallized 3-methyl-1-phenyl-5-pyrazolone in 100 ml. of 95 per cent ethanol, add 25 g. phenylhydrazine, and reflux. Filter off the insoluble product, which is the bis-pyrazolone, at intervals of a few hours, returning the hot filtrate for further refluxing. The reaction may be continued for several days and a yield of more than 60 per cent obtained. Wash the bis-pyrazolone with several portions of hot 95 per cent ethanol. It may then be stored for months.

2.5 Pyridine-pyrazolone reagent. Dissolve 0.63 g. of recrystallized 3-methyl-1-phenyl-5-pyrazolone in 250 ml. of water by heating the mixture to about 75°C. and stirring while it cools to room temperature. To this solution add 50 ml. of redistilled pyridine containing 0.050 g. of the bis-pyrazolone. The bis-pyrazolone will dissolve in the pyridine in about 50 min. The pyridine solution should be freshly prepared, and the solutions should be mixed only shortly before use. The aqueous pyrazolone solution may be stored for 48 hr.

2.6 Standard cyanide solution. Dissolve 2 g. of cp. sodium cyanide in 1 l. of solution. This solution is then standardized by titrating with 0.05 N standard silver nitrate according to the Liebig method, using ammonium hydroxide and potassium iodide to indicate the end point. The standard solution is prepared from this solution by 500-fold dilution.

2.7 Water. Distilled water is needed for the preparation of the reagent and dilutions.

### 3. PROCEDURE

3.0 Preparation of the standard curve. Dilute 0.5-, 1-, 2-, 5-, 10-, and 20-ml. aliquots of the standard solution to 20 ml. in 50-ml. volumetric flasks. To each add 10 ml. of buffer (2.1), 0.3 ml. of 1 per cent chloramine-T, stopper the flask, and shake; after 60 sec. add 15 ml. of the pyridine-pyrazolone reagent, dilute to 50 ml., and mix. After 30 min. (for color development), measure the absorbency at 620 m $\mu$ . Plot milligrams of cyanide *vs.* absorbency.

3.1 Analysis of the sample. Adjust the sample to pH 6 to 8 with a minimum of strong acid or base. Filter the sample to remove silt and insoluble material. Transfer a 20-ml. aliquot to a 50-ml. volumetric flask, and add 10 ml. of buffer (2.1). Add 0.3 ml. of 1 per cent chloramine-T, stopper the flask, and shake; after 60 sec. add 15 ml. of the pyridine-pyrazolone reagent, dilute to 50 ml., and mix. After 30 min., measure the absorbency at 620 m $\mu$ . From the standard curve determine the amount of cyanide present in the original sample.

$$\text{p.p.m. CN} = \text{mg. CN} \times 50$$

### Determination of Thiocyanate

Thiocyanate is determined in sewage and wastes by the formation of a di-pyridine-copper(II)-thiocyanate complex, which is yellow when extracted with chloroform. Cyanide can be removed by boiling. If interfering cations are present, they are removed by passing the solution through a cation exchange column. The

color formed is stable and can be measured immedi-ately.

### 1. APPARATUS

1.1 Spectrophotometer, or photoelectric filter photometer transmitting at 410 m $\mu$ .

1.2 Cation exchange column. The column can be constructed from a piece of 16-mm. tubing constricted at one end and fitted with a stopcock or a piece of Tygon tubing with a pinch-clamp and tip. The column should be about 40 cm. high and packed to a height of 20 cm. with resin. These dimensions, however, are only suggestions and are not critical.

1.3 Separatory funnel, 125-ml.

1.4 Volumetric flask, 25-ml.

### 2. REAGENTS

2.1 Amberlite IR 100-H cation exchange resin. This resin is used in the exchange column. It can be regenerated with 10 per cent sulfuric acid. Similar resins which retain mercury, nickel, and magnesium may be used in place of this resin.

2.2 Carbon tetrachloride, cp.

2.3 Chloroform, cp. The chloroform used in the procedure may be purified by extracting it first with two portions of 5 per cent sodium hydroxide and then with one portion of 10 per cent sulfuric acid. The chloroform layer is then drawn off and distilled for re-use.

2.4 Copper sulfate, 20 per cent. Dissolve 20 g. CuSO<sub>4</sub>·5H<sub>2</sub>O in 80 ml. of water.

2.5 Cotton.

2.6 Pyridine.

2.7 Standard thiocyanate solution. Dissolve 1.7 g. of potassium thiocyanate in 1 l. of solution. Standardize this solution by using it to titrate 0.12 g. silver nitrate, using ferric chloride to detect the end point. The standard solution is prepared from this solution by 100-fold dilution.

2.8 Water. Distilled water is used for all operations in the procedure.

### 3. PROCEDURE

3.0 Preparation of the standard curve. Dilute 5-, 10-, 20-, 30-, 50-, 100-, 150-, and 200-ml. aliquots of the standard solution to 250 ml. and pass the solutions through the cation exchange column. Discard the first 75 to 100 ml. of effluent, and then transfer a 100-ml. aliquot of the subsequent effluent to a 125-ml. separatory funnel. Treat as described in 3.3.

A separate calibration curve is needed for the simplified procedure, which may be used if no interfering cations are present. For this curve, transfer 2.5-, 5-, 10-, 20-, 50-, 75-, and 100-ml. aliquots of the standard solution to 125-ml. separatory funnels, dilute to 100 ( $\pm$  3) ml., and treat as described in 3.3. Measure the color at 410 m $\mu$  and plot milligrams thiocyanate *vs.* absorbency.

3.1 Analysis of the sample. Filter the sample to remove silt and insoluble materials. If no interfering cations are present, measure out a 100-ml. aliquot, adjust the pH to 2.5 to 4 with dilute sulfuric acid or sodium hydroxide, and proceed as described in 3.2.

If interfering cations are present, pass the sample through the ion exchange column. Discard the first 75

to 100 ml. and then use the next 100 ml. of effluent. Wash the column with about 100 ml. of water to prepare it for the next determination. The rate of flow through the column should be 1 to 2 drops per second. In case no cation exchange column is available, it is possible to remove the interfering cations by adjusting the acidity to about pH 11 and filtering off the hydroxides. A double filtration, first through a fast and then through a fine filter paper, is required to remove all of the insoluble hydroxides. If possible, however, an exchange column should be used.

3.2 Adjust the acidity of the effluent to pH 2.5 to 4 with dilute sulfuric acid or sodium hydroxide. If no cyanide or complex cyanides are present, transfer the sample to a 125-ml. separatory funnel and proceed as in 3.3. If cyanides are present, boil the solution for about 15 min. Allow the solution to cool, transfer it to a 125-ml. separatory funnel and bring the total volume to 100 ( $\pm$  3) ml. By marking this volume on the separatory funnel in advance, the required volume can be easily attained.

3.3 Add 2.5 ml. of carbon tetrachloride to the sample and shake the mixture. Allow the phases to separate and drain off and discard the carbon tetrachloride. Add 1.5 to 2 ml. of the 20 per cent copper sulfate solution and about 4 ml. of pyridine. Shake the solution. Add 20 ml. of chloroform and thoroughly shake the solution. Drain the chloroform through a small cotton plug into a 25-ml. volumetric flask. The cotton plug serves to filter out water from the chloroform. Add 5 ml. of fresh chloroform to the sample, shake, and drain the chloroform through the cotton plug into the volumetric flask until the total volume of 25 ml. is attained.

3.4 Measure the absorbency or transmittance of the chloroform layer at a wave length of 410 m $\mu$  with a spectrophotometer. In case a filter photometer is used, select a filter having a peak transmittance as close to 410 m $\mu$  as possible, even though the solution may appear green rather than yellow. From the standard curve obtain the amount of thiocyanate in the sample, and from this calculate the thiocyanate concentration in the original sample.

$$\text{p.p.m. SCN} = \frac{\text{mg. SCN} \times 10,000}{\text{ml. sample}}$$

3.5 Note: If the original sample contained less than 0.5 p.p.m. thiocyanate, a larger sample should be used in 3.1. Collect a large enough amount of effluent from the columns to contain at least 0.5 mg. thiocyanate. Boil the solution in step 3.2 until the volume is less than 100 ml., and then proceed as described.

#### Determination of Cyanate

Cyanate ion in the concentration range of 0.1 to 10 p.p.m. forms a color with the pyridine-pyrazolone reagent in weakly acidic solutions. However, ammonia also forms this color under the same experimental conditions, so the removal of ammonia prior to the determination of cyanate is necessary. This separation is accomplished by passing the sample through a cation resin to retain the ammonia. The column should operate on the sodium cycle, as strongly acidic resins will decompose cyanate.

Thiocyanate and cyanide will also produce colors with the reagent. However, by extracting the aqueous solution in which the color had been formed with carbon tetrachloride, the relative intensity of the cyanate color is greatly enhanced while that of the thiocyanate and cyanide is decreased. A two-component analysis is sometimes possible. If less than 0.25 p.p.m. of cyanide or thiocyanate is present, their interference becomes negligible.

The cyanate solution is then treated with a 3 per cent solution of chloramine-T to convert the cyanate to ammonia or some intermediate compound which is also formed by adding the pyridine-pyrazolone reagent. Color development is complete in less than 60 sec. The solution is then extracted with carbon tetrachloride to increase the sensitivity of the method for cyanate. In carbon tetrachloride the color is stable for several hours.

#### 1. APPARATUS

1.1 Spectrophotometer, or photoelectric filter photometer transmitting at 450 m $\mu$ .

1.2 Cation exchange column. The column can be constructed from a piece of 22-mm. tubing constricted at one end and fitted with a stopcock or a piece of Tygon tubing with a pinch-clamp and tip. The column should be about 40 cm. high and packed to a height of 20 cm. with resin. All of the dimensions may be changed, however.

The resin should be of the sulfuric acid or polystyrene type and operate on the sodium cycle. Resins that have been found satisfactory are Amberlite IR 100-H, IR 120, Dowex-50, and Illeco C-211. The acid resins may be converted readily to the sodium cycle by passing a sodium chloride solution containing some sodium hydroxide through the column until the effluent is alkaline. After washing with water, the column is ready for use. The column should be checked occasionally for break-through of ammonia. (Columns in use in this laboratory are still satisfactory after more than 100 determinations.)

1.3 Separatory funnels, 125-ml.

1.4 Transfer pipette, 1-ml., graduated.

#### 2. REAGENTS

2.1 Buffer solution, pH 3.7. To 45 ml. 10 per cent sodium acetate in 440 ml. of water add enough concentrated acetic acid to give a pH of 3.7.

2. Carbon tetrachloride, cp. The carbon tetrachloride used in the procedure may be purified by distillation.

2.3 Chloramine-T, 3 per cent. Dissolve 0.6 g. of chloramine-T in 20 ml. of water.

2.4 3-Methyl-1-phenyl-5-pyrazolone. The pyrazolone is recrystallized twice from 95 per cent ethanol, and can then be stored for months in a dark bottle.

2.5 Bis-(3-methyl-1-phenyl-5-pyrazolone). Dissolve 17.4 g. of the recrystallized 3-methyl-1-phenyl-5-pyrazolone in 100 ml. of 95 per cent ethanol, add 25 g. phenylhydrazine, and reflux. Filter off the insoluble product, which is the bis-pyrazolone, at intervals of a few hours, returning the hot filtrate for further refluxing. The reaction may be continued for several days and a yield of more than 60 per cent obtained. Wash

this bis-pyrazolone with several portions of hot 95 per cent ethanol. It may then be stored for months.

2.6 Pyridine-pyrazolone reagent. Dissolve 0.63 g. of recrystallized 3-methyl-1-phenyl-5-pyrazolone in 250 ml. of water by heating the mixture to about 75°C. and stirring while it cools to room temperature. To this solution add 50 ml. of redistilled pyridine containing 0.050 g. of the bis-pyrazolone. The bis-pyrazolone will dissolve in the pyridine in about 50 min. The pyridine solution should be freshly prepared and the solution should be mixed only shortly before use. The aqueous pyrazolone solution may be stored for two or three days.

2.7 Standard cyanate solution. Dissolve 2 g. of potassium cyanate in 1 l. of solution, and standardize by titration with silver nitrate.<sup>5,6</sup> The standard solution is prepared from this solution by 200-fold dilution, and should be made slightly alkaline. This standard solution is stable for about one week.

2.8 Water. Distilled water is needed for the preparation of the reagent and dilution.

### 3. PROCEDURE

3.0 Preparation of the standard curve. Dilute 1-, 2-, 5-, 10-, 25-, and 50-ml. aliquots of the standard solution to about 50 ml. in 125-ml. separatory funnels, and treat by the procedure described in 3.2. Plot milligrams of cyanate vs. absorbency.

3.1 Analysis of the sample. Filter the sample to remove solids, and then pass the sample through the ion exchange column. Discard the forerun (75 to 100 ml.) and then collect the next 50 to 60 ml. Transfer 50 ml. to a separatory funnel. Wash the ion exchange column with distilled water to prepare it for the next sample.

3.2 Adjust the pH of the sample to approximately 3.7 with acetic acid. Add 10 ml. of buffer (2.1) to the sample and mix the solutions. Add 0.9 ml. of 3 per cent chloramine-T. Stopper and shake the funnel. Add 30 ml. of the pyridine-pyrazolone reagent 90 sec. after the addition of the chloramine-T, and again shake the funnel. After 150 sec., extract the color with carbon tetrachloride. If thiocyanate or cyanide are absent, this time interval is not critical and either 25 or 50 ml. of carbon tetrachloride may be used for the extraction. If the color of the aqueous phase before extraction is only a pale purple, 25 ml. of carbon tetrachloride should be used; otherwise, use 50 ml. The carbon tetrachloride should be measured into volumetric flasks.

3.3 Measure the absorbency of the sample at 450 m $\mu$  and obtain the amount of cyanate present from the standard curve. A reagent blank has to be tested with each set of determinations, and the absorbency of the blank subtracted from the measured absorbency.

$$\text{mg. OCN} \\ \text{p.p.m. OCN} = \frac{\text{mg. OCN}}{2.5} \times \text{ml. CCl}_4 \text{ used}$$

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### ANALYTICAL CONTROL

(Concluded from page 96)

the barrels had previously contained glue. The solution that was made when the right salts were obtained produced the desired results.

In 1916 William Price asked and received a copy of the solutions developed, as described above. These were printed in "Technical Analysis of Brass" of which he was co-author.

When the book on the electrodeposition of metals was prepared for publication, all the formulas and methods of analyses that had been used in commercial production were included, except that of lead fluoborate. While it is very probable that other platers had developed and used methods of control of plating solutions, to our knowledge the above story of ascertaining a good workable formula for the several plating solutions and controlling them by periodic chemical analysis had not been previously practiced. Today control is an essential.

Those who assisted deserve full credit for being foresighted and progressive enough to realize that there is only one way by which consistent results can be obtained with any plating solution or the processes entering into successful commercial production. That is by periodic chemical analysis and by keeping the ingredients in the preparation of plating solutions within definite limits. In conclusions, it can be stated that a more complete knowledge of electric control will add to a plater's success. Such has been my personal experience.

### INSIDE POLISHING AND BUFFING

(Concluded from page 98)

tory. Felt bobs can be shaped to a point, tapered, or made thin at the edge. Similar principles are involved in the use of felts and muslin bobs with the exception that felt will not be as flexible. This means it cannot conform to the inside shape and, therefore, must be pre-shaped. More care also has to be given to pressure, as felt cannot distribute the pressure over the surface as evenly.

Inside shapes can be polished economically. Often, grinding or polishing on inside surfaces with buffs can bring about substantial savings on other, more costly, machining operations. Product appearance can be improved. Using the above principles should help facilitate faster and better inside finishes.

# First International Magnesium Exposition

By Charles A. Cerami

THE first International Magnesium Exposition, held in Washington, D. C., from March 31st to April 2nd, was like a look into the future—bringing the new techniques of the post-war years to an industry which apparently is just beginning to realize a promise which it has long held. This was the largest display of products, live exhibits and know-how about magnesium ever gathered into one place.

Inside the mammoth National Guard Armory \$50,000,000 worth of products were crowded, brought by exhibitors from all parts of the U. S., Canada, England and Germany.

Whereas less than a decade ago there were only a handful of companies pioneering in this field, today thousands of firms make products that utilize magnesium—a metal that can be cast, extruded, formed, welded or machined. And when it is considered that the plating of magnesium was classed as a major difficulty only two or three years ago, the extent to which varied surface finishes are now routinely applied is astonishing. All common electroplating materials can now be deposited on magnesium alloys for wear-resistant or decorative finishes.

The Magnesium Association—now nine years old—has seen its membership grow from a small group of pioneers to a world-wide enrollment. It has worked with the armed services to develop transportation, communications and supply equipment, and with the Underwriters' Laboratories to develop standards of



Photo-enlarger supplied with either frosty-metallic or wrinkle finish.

safety and to obtain approval for the use of magnesium in electrical appliances.

In this era of scarcity, magnesium is the rarity that exists in abundance. "As inexhaustible as the sea" is the phrase often applied to it because sea water is one important source for the metal. It is the sixth most abundant chemical in the world and constitutes 2½% of the earth's crust.

Because of this ample supply, the volume of production has been the major factor in determination of price and the level has therefore dropped steadily with the increase in use: from \$5.00 per lb. in 1915 to less than 30 cents today.

From the surface finishing point of view, one of the outstanding developments was Dow Chemical Company's introduction of its new "No. 17 Anodize." This material eliminates the need for pre-treatment or pre-pickling, provides a good paint base and has a thermal stability as high as the metal itself. In other words, this treatment cannot be adversely affected by high temperature until the point is reached where the magnesium itself would begin to melt away. Thus the use of magnesium is made possible in certain portable tools and other items where electric current is a factor.

## Coatings for Magnesium

Magnesium die castings are usually finished by means of paint base treatments (generally applied by the supplier), followed by solvent cleaning and touch-up chrome pickling before the primer or finish coat is applied. Or, if purchased in the "as cast" condition, they are first alkaline cleaned; this cleaning is followed by either (a) a semi-bright frosty metallic finish, (b)



Vacuum cleaners and sewing machines using magnesium casings and parts.

electroplating or (c) black, anodic or paint-base treatments followed by primer or finish coat.

Sand castings and wrought magnesium require somewhat more complex finishing procedure, but the basic requirements follow the same pattern as above.

Mechanical finishing—by polishing, buffing, tumbling and burnishing—can be used as a final finish when protected with clear baked lacquer. More often, however, these mechanical methods are used as preparation to produce special effects in connection with subsequent chemical or electro-chemical coatings.

The electroplating process mentioned above consists of an immersion zinc coating (under a process patented by the Dow Chemical Company), followed by copper striking in a copper cyanide bath and then plating with any material which can be electrodeposited: chromium, copper, nickel, brass, silver, cadmium.

In the case of paint finish, a primer should be chosen which adheres to a bare magnesium surface as well as to a chemically treated surface, since the chemical coat may often become scratched in the assembling process and the surface may have bare spots. Care should also be taken not to select a "wash primer" with enough phosphoric acid content to cause etching of the metal and bubbles in the paint film.

Included in the finish coatings that can be used with magnesium are hard and soft rubber coatings for such uses as platens on typewriters and business machines and control wheels for aircraft.

Various special finishes are also available to give wrinkle or hammered appearance, the techniques for application being much the same as with other metals. It is these that make possible the wide variety of uses on display at the exposition—such as casings for Dictaphone machines, portable radios and similar objects that benefit from the weight reduction afforded by magnesium.

(Note: The epoxy-base resin coatings are believed to offer another and rather spectacular possibility for widening the magnesium field. The epoxys adhere so well to magnesium that they may make it possible to paint the surface without any prior pickling or treatment whatever. This development was not brought out at the Exposition because it is still in the experimental stage, but a forthcoming article in ORGANIC FINISHING

magazine will summarize this and other progress made with epoxy coatings.)

Another display of maximum interest from the finisher's point of view was the Army Ordnance Corps' HAE coating for magnesium. Named for its discoverer, H. A. Evangelides, a Frankford Arsenal electro-chemist, this electrolytically-applied coating has remarkable properties of corrosion-resistance, dielectric strength, resistance to high temperatures and hardness.

Panels coated with HAE may be subjected to two Fisher blast burners until the magnesium melts, yet the HAE coating on the bulging panel remains unaffected. The coating itself withstands temperatures up to 3,200°F., so that many experiments can be devised for melting away the magnesium; in all such instances, the HAE has remained intact.

The strength of the bond has been demonstrated by heating HAE-treated magnesium to 1,100°F. and dropping it into cold water. No sign of loosening is detected.

Resistance to corrosion under salt spray tests is remarkable—4,500 hours when the coated surface is waxed. And abrasion-resistance is such that 8,000 cycles of the Taber Abraser, using the CS17 wheel and 1,000 gram weight, produced no breakdown of the HAE.

#### **Magnesium in the Aircraft Industry**

In the aircraft field, magnesium cast wheels, struts and engine parts give the greatest strength-to-weight ratio, since the metal weighs only one-fourth as much as steel and one-third less than aluminum. In 1952, 29% of all U. S. magnesium went to the aircraft industry.

The aeronautical showpiece of the affair was the Douglas D-558, the famous "Skyrocket" plane with its swept-back wing and long swordfish snout. The external fuselage covering of the "Skyrocket," which has flown 1,238 miles per hour and climbed to 79,454 feet, is of formed magnesium sheets and the landing wheels are solid magnesium castings.

Northrup Aircraft, Inc., in cooperation with the Aluminum Company of America, has produced what is believed to be the largest cast aircraft surface ever produced—a 16-foot airplane wing section cast in a single piece from magnesium.



Many different types of finishes may be applied to magnesium parts.



R. J. Cross demonstrates his all-magnesium body automobile.

Several military helicopters were also on view, including a large Sikorsky which could not be brought into the Armory and finally had to be re-assembled and left outside the front door. Another of the Sikorsky models, the S-55, which can be carried in the cargo compartment of a C-24 Globemaster, is almost entirely fabricated from magnesium sheet and contains 100 magnesium castings.

Closely related to the helicopter display was the large magnesium "pod trailer" which can be carried by the fantastic Piasecki XH-16 helicopter, as well as by large military cargo planes, and can be made "roadable" when on the ground by lowering a set of wheels and connecting it with a motor truck.

Several types of jet engines which are in current military use were included in the Exposition. As an example, the Westinghouse J34 Turbojet was shown, its front bearing support and compressor casing being of magnesium.

Brooks & Perkins, Incorporated, the largest fabricators of magnesium exclusively, have concentrated to a considerable degree on parts related to military aircraft since World War II, yet they are characteristic of the firms in this field which have taken an interest in an unusually wide variety of lines because such varying items suggest themselves for magnesium use. Brooks and Perkins, for example, have made bakery delivery cabinets, artificial limbs, skillets, canoes and scores of other dissimilar products, in addition to the aircraft parts in which they have specialized.

Military uses other than for aircraft include portable "manpack" radios and teletypewriters for the Signal Corps. The printer for the teletypewriter set weighs only 45 lbs. and replaces a piece of equipment which formerly weighed 225 lbs.

#### **Automobile Bodies Made From Magnesium**

English inventor R. J. Cross showed the all-magnesium auto body which he has developed and which he predicts will be the body of the future, rather than plastic bodies which have had more public attention.

Mr. Cross, managing director of Essex-Aero, Ltd., said his tests show that the magnesium body is at least as cheap as plastic, is lighter and more practical, can be more easily repaired with existing facilities, and may eventually be incorporated with the chassis.

The one-piece body shown at the Exposition weighs 132 pounds and is mounted to the chassis at only six points.

Magnesium-Kontor of Germany showed the many commercial civilian uses to which it is putting the metal, all demonstrating great ingenuity in the development of fabricating techniques. These included a complete set of castings used in the Volkswagen, low-priced German car, and both casings and parts for adding machines and typewriters.

Another automotive exhibit was the Cummins Diesel Special No. 28, pole position winner at the 1952 Indianapolis 500-mile race, which has unusually low engine weight because of a 6-cylinder Diesel engine utilizing all-magnesium castings, except for the cylinder block and heads.

Since magnesium is said to be the best material for any object which must be lifted or moved by humans, it naturally finds one of its great outlets in the materials handling industry. The magnesium dockboard is the most successful of these products to date, capacities ranging to 30,000 pounds and higher. Hand trucks made from tubular magnesium are becoming a boon to such personnel as beverage truck drivers who have to lift their hand trucks on and off the truck some 50 times per day.

#### **Domestic Uses**

Not only for industrial applications, but for many domestic uses as well, magnesium is being found in an increasing number of products: a vacuum cleaner which is approximately one-half the weight of conventional ones; a ladder one-third the weight of other metal ladders, which can be carried easily in one

(Concluded on page 109)

# The Effect of Chromium Plating of Steel on the Fatigue Limit

By George M. Cabble, Jr.

This article is based on Bulletin No. 82 of the Engineering Experiment Station Series of the Virginia Polytechnic Institute entitled "The Effect of Chromium Plating on the Endurance Limit of 4340 Steel" by George M. Cabble, Jr. The author wishes to acknowledge the assistance of the Norfolk and Western Railway Company in preparing the test specimens.

LOCOMOTIVE side rods made of AISI 4340 steel which had been chromium plated at the lateral faces of the bearing openings for increased wear resistance showed failures of a fatigue type which suggested an effect on fatigue limit due to chromium plating. These fatigue failures led the Research and Test Department of the railroad to recommend the discontinuance of the plating operation which had been in use for several years.

The practice had been to apply chromium plating about 0.010" to 0.015" thick, directly on the base metal, all other portions of the rod being blocked off. After the rod had been in service and the plating worn down by normal wear, the faces were replated without removing the old plating.

## Review of the Literature

A review of the literature disclosed that very little had been written on this particular subject. For example, one of the leading handbooks in the field of fatigue of metals<sup>1</sup> covers the theory of fatigue and all its ramifications. It covers all the known effects in fatigue testing together with a bibliography of 914 references. However, the effect of chromium plating on the fatigue limit of steel is given only in one table of comparative data taken from an unpublished report by H. K. Cummings.<sup>2</sup>

In this report data are given on the fatigue limits of rotating beam fatigue specimens of SAE 6130 steel. Group I consisted of quenched and tempered specimens, while Group II was composed of specimens only normalized.

	Group I	Group II
Not plated	65,500 psi	33,000 psi
Plated 0.00015" thick	38,000 "	30,000 "
Plated 0.0045" thick	41,000 "	32,000 "

It was and still is believed that the reduction of fatigue limit is due to residual tensile stresses set up in the deposited material. As long ago as 1860 these

stresses were reported. Not until 1929 was anything else of importance reported, when Lea<sup>3</sup> reported that electroplating did not alter the static strength of steel. The concept that loss in fatigue strength was due to hydrogen embrittlement was also discussed. The following year a paper by Barklie and Davies<sup>4</sup> gave the results of tests on nickel, copper, zinc, and lead plating. These authors, in 1927, found a loss of fatigue strength due to electroplating. They claimed the high stresses in deposited metals plus the imposed stresses cause cracks which then act as stress raisers at their base. They also found that residual compressive stresses in deposited metal did not decrease the fatigue limit. Another interesting discovery was that a thin lead film, as thin as ten one-millionths of an inch, between nickel and steel insulates the steel core from the effect of stressed nickel deposits.

That some use could be made of the laboratory discoveries was proven by Williams and Brown<sup>5</sup> who made tests on various full-size crankshafts. The results of the tests on chromium plated crankshafts show that the percentage reduction in fatigue limit is substantially the same for full-size machine elements as for laboratory specimens.

While most of the earlier work on this subject was reported from England, a large amount of the more recent work comes from this country. The next important paper after the publication of the handbook by the Battelle staff was by Logan.<sup>6</sup> This paper confirmed the fact that chromium plating reduced the endurance limit of certain steels. It claimed that surface grinding slightly increased the endurance limit. Most important was the fact that a one hour baking at 440°C. after chromium plating significantly increased the fatigue limit of 6130 steel. Baking temperatures less than that decreased the endurance limit.

The status of knowledge of the effect is very well summed up in an unsigned article<sup>7</sup> which says: "It is well-known that electrodeposited coatings of some metals on steel may reduce the fatigue limit of the basis metal, and a certain amount of work has been done with the object of defining the conditions of deposition and subsequent treatment designed to minimize this detrimental effect. There is no general solution of the problem; the effects are different with different metals and each metal must be studied separately."

This paper goes on to point out that results of Logan's baking experiments tend to prove that hydrogen embrittlement cannot be solely responsible for the reduction in fatigue limit.

It is also pointed out that the microscopic cracks observed in most chromium deposits and thought by some to be responsible for the reduced fatigue limit are not observed in all chromium deposits and these specimens without cracks have just as large a reduction in fatigue limit.

That residual stresses are present in the chromium deposit is not denied, but contradictory results from various investigators indicate that the effects of plating technique are not fully understood.

Almen,<sup>8</sup> in a recent paper on the subject, mentions a special procedure of nickel plating which left the plating with residual compressive stresses. The compressive stressed, nickel plated steel had a fatigue limit equal to the unplated steel while the tensile stressed, nickel plated steel showed a reduction of fatigue limit of 35 percent.

It was also found that mechanical prestressing was effective. For this test shot peening was used, although surface rolling would probably have the same effect. Chromium plated steel showed a reduction of fatigue limit of 19.1 percent from that of the unplated steel. Shot peened steel showed an increase of 10.6 percent whereas steel, shot peened and then chromium plated, showed an increase in fatigue limit of 8.5 percent compared to the fatigue limit of unplated and unpeened steel.

#### Purpose of the Investigation

In view of the many research possibilities, it was necessary to narrow the problem down as much as possible. It was felt that the problem was to investigate the effect on fatigue strength of chromium plating heat treated AISI 4340 steel.

Since the search of the literature revealed that chromium plating reduced the fatigue limits of all steels which had been tested after chromium plating, it was reasonable to assume that the same would happen with AISI 4340 steel. However nothing was found in the literature on the effect of more than one plating process on the fatigue limit.

In view of these facts the decision was made to investigate:

1. The percentage of reduction in fatigue limit of AISI 4340 steel due to chromium plating.
2. The effect of a baking cycle after chromium plating on the fatigue limit of AISI 4340 steel.
3. The effect of a second plating after the first had worn down on the fatigue limit of AISI 4340 steel.

The three stated objectives could be accomplished by the testing of five different categories of specimens. The five categories and some comments on each follow:

1. Heat treated AISI 4340 steel without chromium plating or baking.

Although two unpublished fatigue limit curves were available from the manufacturers of the steel, there was a difference of ten percent in the fatigue limit of the two heats. For that reason it was felt necessary to establish a fatigue limit for the particular heat from which all the specimens would come.

2. The same heat treated steel with a chromium deposit and no other treatment.

This would provide an answer for the first of the objectives.

3. The same heat treated steel with a chromium deposit and a baking cycle at 825°F.

This would provide an answer for the second of the objectives.

4. The same heat treated steel with a chromium deposit, no baking cycle but buffed down to simulate wear that would be received in service. Then a second chromium deposit on top of the first.

This would provide an answer to the third of the objectives.

5. The same as the last previous category but with a baking cycle after each plating operation.

This would provide a further answer to the second and third objectives.

#### Preparation of Specimens

In order to get results that could be considered significant, it was necessary to eliminate as many variables as possible. The first requirement was that the steel of all the specimens be as similar as possible. That meant that all the specimens should be made from steel produced in the same heat. Thirty feet of  $\frac{5}{8}$  inch diameter, hot rolled, round, AISI 4340 steel in multiples of five inch lengths, all from the same heat, were obtained.

This steel was sent to the railroad shops where it was all heat treated at the same time. The steel was also machined at the railroad shops where each piece was first rough turned using a carbon steel tool. All specimens were prepared by the same machinist. The specimens were then finished on an automatic lathe, which operates from a profile template, thus producing the same radius and diameter for each specimen. The finish machining was done with a high speed tool without a coolant.

The shoulders of the specimen were ground. During the grinding operation, the specimen was revolved counter to the direction of the grinding wheel. Next the center portion of the specimen was ground with a wheel which was contoured to the desired radius of that portion of the specimen. The polishing operation was done with a sanding belt on an inflated wheel, followed by polishing with a finer belt. The final polishing was done with metallurgical polishing paper in the longitudinal direction.

The plating operations were performed in the plating shop of the railroad. All portions but the center or test portion of the specimens were blocked off so that no chromium would be deposited on the parts of the specimens that fit into the chucks of the test machines. The processing given the specimens was the same as that given the actual side rods of locomotives and consisted of the following:

The specimens were first placed in a tank and washed in petroleum spirits, after which they were moved to the alkali tank where they were rinsed in cold water. The stop-off lacquer was then applied to the parts not to be plated, and the specimens placed in a rack. This was followed by a dip in the electro cleaner tank with reverse current at six volts, and then a cold water rinse. Next they went into the acid dip tank,

followed by another rinsing in cold water. After this, the specimens were placed in the chromium plating tank where they were etched with reverse current at six volts for one minute.

In this tank, a lead anode was used as the positive electrode, and the specimen as the negative electrode. The anode material was a 7 percent tin — 93 percent lead alloy. The solution was 250 grams of chromic acid per liter and 2.5 grams of sulphate radical per liter. The solution was kept at a constant temperature of 131°F. The voltage was six volts with the amperage 2.5 amperes per square inch, or a total amperage of five amperes. The time in the plating bath was two hours, which gave a deposit of hard chromium approximately 0.003" thick.

After removal from the plating tank, the specimens were placed in the reclaim tank to remove excess chromic acid. Next came a hot water rinse, after which the stop-off lacquer was removed.

Those specimens which were to be plated a second time were buffed down to simulate wear received in actual service by the side rods. They were then plated a second time in a manner similar to the first plating with one exception. The amperage in the plating tank was begun at one ampere per square inch and gradually increased to 2.5 amperes per square inch.

The baked specimens were baked in an oven at 825°F. for 45 minutes and then air cooled. The specimens were wrapped to exclude moisture until ready for use.

The two testing machines used were R. R. Moore type, high speed, rotating beam fatigue testing machines. Since two machines were used in these tests, it was felt desirable to check the machines, one against the other, in regard to induced stress versus applied load. This was done by attaching an SR-4 paper-bonded wire resistance strain gage to an unplated specimen at its minimum diameter. The specimen was placed in the machine, load applied, and the strains read on a strain indicator. This was done for each machine. These data showed that the machines were similar, the maximum variation in stress being 130 psi. at 15,160 psi., or a variation of less than 0.9 percent.

When a specimen was to be tested, it was removed from its wrapping and the two ends which were to be inserted into the chucks of the test machines were lubricated. This was done to prevent fretting corrosion which would otherwise occur. The ends of the specimens were then inserted in the test machine and firmly fastened. Care was taken never to touch the specimen with the bare hand.

The test was run until either the specimen broke, or enough cycles of stress had been completed that it was felt that the specimen would not break thereafter. Steel usually will not break if it has undergone more than ten million cycles without failure.

The object of fatigue testing is usually to establish fatigue limits. Fatigue limits are best illustrated by plotting curve of "stress versus number of cycles of reversal of stress" or, as it is commonly called, an "S-N" curve. The results of this investigation are given as "S-N" curves plotted on semi-logarithmic paper. These curves are shown in graphs one through six.

The values of fatigue limits for AISI 4340 steel under the specified methods of treatment were:

Not chrome plated	73,000	psi
Chrome plated once	57,500	"
Chrome plated once, baked once	72,500	"
Chrome plated twice	50,500	"
Chrome plated twice, baked twice	69,500	"

### Discussion of Results

1. The percentage of reduction in fatigue limit of AISI 4340 steel due to one chromium plating was 21 percent, based on the fatigue limit of unplated AISI 4340 steel.

2. The effect of a 45 minute baking at 825°F. after chromium plating on the fatigue limit of AISI 4340 steel was to restore the fatigue limit almost to the value of that obtained with the unplated steel. For specimens plated once and baked once, the fatigue limit was 99 percent of the fatigue limit of the unplated steel.

3. The effect on the fatigue limit of AISI 4340 steel of a second plating after the first had been worn down, was a further reduction. The reduction in fatigue limit was 31 percent, based on the fatigue limit of the unplated steel, and 12 percent based on the fatigue limit of the steel chromium plated once. For specimens plated twice and baked twice, the fatigue limit was 95 percent of the fatigue limit of the unplated steel.

There are a number of extraneous effects that could be introduced into fatigue results. It is important to explain the precautions taken to try to avoid these.

The first is the speed of test. Since these tests were run at speeds in the neighborhood of 10,000 revolutions per minute, there might be a question as to the effect this high speed would have on the results. Several investigators<sup>9,10</sup> have shown that test speeds from 1800 to 12,000 rpm have no significant effect on the fatigue limits of steels.

The second is the effect of size of specimens on the fatigue limit. Much research has been done on this question, but Dolan and Hanley<sup>11</sup> investigated this effect on the same steel as was used in these tests, i.e., 4340 steel. On the basis of their conclusions the maximum variation in fatigue limits due to the different sizes of specimens used in these tests, 0.300" and 0.260", is 300 psi. Since fatigue limits cannot be considered accurate to less than 500 psi in most cases, this variation would not seriously affect the results.

Considering the extraneous effects as well as the difficulty of fitting a curve to experimental points and the statistical deviation that can be present when a fatigue limit is established with relatively few points, a safe estimate would be that the fatigue curves obtained in this investigation are accurate to the nearest 1,000 psi. This does not imply that large machine elements, such as the driving rods of locomotives, would show the same fatigue limits. On the contrary, Horger, Buckwater and Neifert<sup>12</sup> have shown that fatigue limits are much lower for large diameter shafts or axles than for small circular specimens. However, Williams and Brown<sup>5</sup> have shown that the percentage loss in fatigue strength of chromium plated machine elements is substantially the same as in laboratory specimens.

(To be concluded next month)

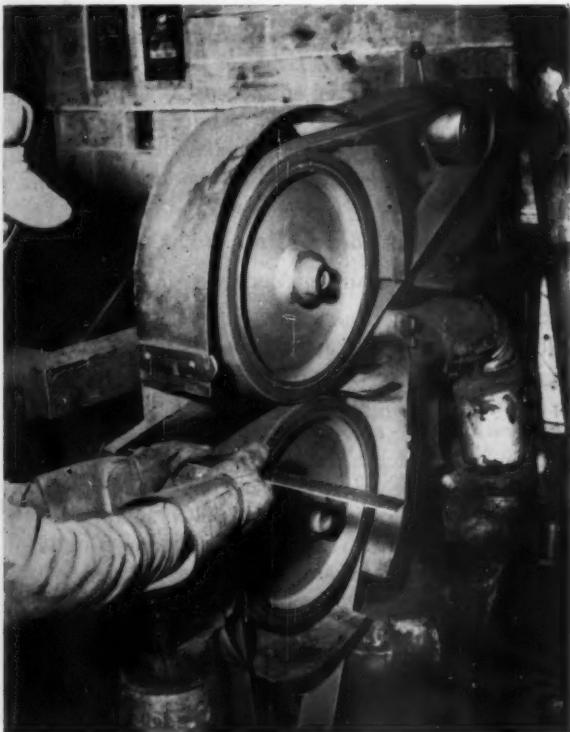
# Practical Hint for the Polisher

## RATE OF GRINDING FLAT PART DOUBLED BY USING TWO ABRASIVE BELTS AT ONCE

TWO coated abrasive belts, running over vertically opposed contact wheels, doubled the production finishing rate of carpenter squares for one midwest manufacturer. This setup permitted both sides of the flat metal product to be ground at once.

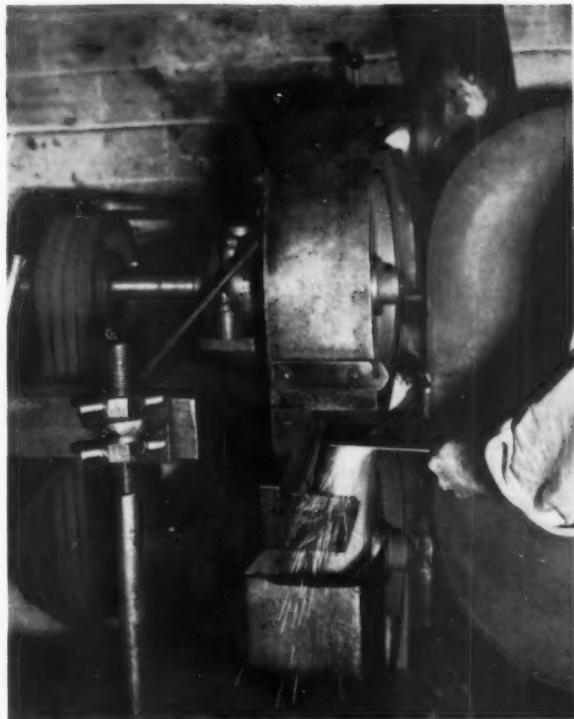
Previously, the squares were offhand polished on abrasive coated setup wheels. The original objective in converting from setup wheels to coated abrasive belts was to take advantage of the better finish produced and the reduced cost in operation possible with belts. The double belt machine was a subsequent development.

The machine consists of two coated abrasive belt grinders mounted in one frame and drive by one electric motor. The bottom belt runs vertically and the top belt runs horizontally. Rubber rimmed contact



(Courtesy Behr-Manning Corp., Troy, N. Y.)

Figure 1. Both sides of flat metal part being ground in one operation. Square is passed through fixed gap between two coated abrasive belts. Contact wheels on shafts at fixed center distance balance grinding pressure across the square. With contact wheels turning same direction, pull on square is balanced.



(Courtesy Behr-Manning Corp., Troy, N. Y.)

Figure 2. Two threaded rods (in foreground) are the means for adjusting the center distance between contact wheels. By turning the nuts on the rods, the gap between belts can be changed to suit thickness of finished work. Notice the triple V-belt drive that turns both contact wheel shafts the same direction.

wheels support the belts where they contact the work and act as belt drive wheels. Two backstand idler pulleys, one in the frame base and one on the rear frame, maintain belt tension.

Center distance between the two contact wheels is fixed to maintain a gap between opposed abrasive belts equal to the final desired thickness of the square. However, the frame is adjustable to permit changes in center distance for grinding thicker or thinner stock.

Since the same four V-belts from the motor drive both contact wheels, both contact wheels run counter-clockwise (as viewed from right side) at the same speed. With wheels of equal diameter the surface speeds of the belts are equal. This balances the thrust or pull on the square being ground and permits the operator to retain full control of the work.

## INTERNATIONAL MAGNESIUM EXPOSITION

(Concluded from page 105)

hand; junior furniture made from magnesium which can be lifted with ease by a child and is both sturdy and easy to clean; a magnesium kitchen step-stool which weighs 2 lbs. as compared with the usual 10; a magnesium 2-burner griddle which gives more uniform heat over the entire cooking surface.

Crutches made from magnesium are an inevitable development, giving greater strength with far less weight. Other health uses include artificial limbs, containers for shipping blood, portable X-ray equipment, and iron lungs which can be transported by air more easily in cases of emergency. A magnesium walker weighing no more than a quart bottle of milk has been developed for polio victims.

# EXTRACTS

From the World's  
Plating Literature

## Suppression of Noise and Vibration in Plating Shops

*Galvano* (Paris), vol. 21, No. 188, pp. 25-27.

Particularly with the smaller plating shops, vibration and noise can be a serious nuisance; these smaller plating plants are most often located in crowded areas, often in close proximity also to residential areas and complaints on this score can easily arise. Apart from possible action on the part of the local authorities for the suppression of the noise, this matter also has another aspect. Noise and continuous exposure to it can give rise to industrial fatigue, with resultant loss in efficiency; reduced output and greater proneness to accidents. The quality of the work produced can also suffer as a consequence. Even though the operative personnel become accustomed to the noise and make no complaints to the management, it has the effect of fatiguing the nervous system. This becomes apparent if measures have been taken to suppress the noise and it ceases. A feeling of relief then becomes noticeable to all those who have been working in the vicinity of the noise.

Equipment in the plating shop, likely to offend on the score of noise and vibration, are polishing heads, tumbling barrels, shafting, motors and plating barrels. Naturally, it will not be possible to suppress the noise entirely whatever measures are taken, for example the noise of the part being polished against the wheel, or of the parts moving in the plating barrel or in the tumbler, but the suppression of vibration in the machine part will serve to reduce this noise considerably and down to reasonable proportions. Although it would appear simple at first sight to reduce noise, the problem is not an easy one and requires careful thought. Where the machines are bolted down directly to the floor, the interposing between the machine and the floor of bands of cork, felt or rubber will be found to give only slight improvement; in actual fact the machine is still connected to the floor by means of the bolt and the operational vibration and consequently the noises are still transmitted through these holding bolts. If it were possible to place the machine directly on the felt or rubber without fastenings, and the machine remained stable by virtue of its own weight when in motion, the problem would then be solved. There would then be no bond between the machine and the floor and the vibration transmission would be suppressed.

Up to now, as the above arrangement is not practically possible, vibration and noise suppression arrangements for machinery in motion has been in the direction of special holding-down fixtures for the machinery, in which the vibration transmission is damped out. These layouts however, although effective, are somewhat costly. In addition also, this arrangement, apart from the expense involved has not always been

found to be effective; the machine-floor coupling arrangement can enter into resonance with the vibration and the remedy can then be worse than the previous evil. Bedding the machinery on massive concrete blocks insulated from the walls has also been found to be ineffective. A relatively simple, cheap and effective anti-vibratory measure has been found to be in interposing between the machine and the floor a band of compressed felt. A coating of a special adhesive is applied on to each face of the felt. The felt is placed on the floor and the machine on the felt and the arrangement is allowed to dry for 48 hours. This is all that is necessary and, as can be seen, it is an extremely simple operation. It is quite inexpensive and can easily be carried out by the shop labor force; the results obtained are excellent. At first sight it might appear that the machine will not be fastened down securely enough by the adhesive to withstand the stress, for example of a polishing head on large and heavy work; experience has shown however that the seal to the floor holds in place perfectly under all conditions. The adhesive bond is capable of taking a stress of 7 kg. per sq. cm. Thus a band 10 x 10 cm. will resist a shearing force of between 500 and 700 kg. and, if the four legs of a polishing head are each fixed by such a band, displacement of the polishing head will be impossible whatever the force exerted by the polisher. The specially prepared felt is available in strips of 5 to 20 mm. thickness. The machine mounting is calculated so that the pressure withstood by the felt is about 2,500 kg./sq. cm. The thickness of the felt depends on the weight of the machine; for small machines weighing less than 200 kg. a felt thickness of 5-6 mm. is sufficient. The thickness will also depend on the vibration from the machine; for polishing heads a thickness of 10-12 mm. will be suitable. Felt is generally preferable to rubber as it is sufficiently flexible without being excessive so; for machines turning at a low speed with excessive shock such as tumbling and deburring barrels for example, rubber will be preferable as the base support on which the machine is fixed by the adhesive.

## Testing of Anodic Films on Aluminum

W. Ruff; Fifth National Congress of Italian Metalurgical Association.

It is shown by the author that the deviations observed with the various electrical test processes as regards the film rupturing voltage can be ascribed to factors which are associated with the phenomenon of sparking. Considerably more informative and comparable results have recently been obtained by increasing the test voltages to a value which is maintained so that a certain current flow occurs. The magnitude of this current flow is measured by means of an instrument whose working principle is based on a "magic eye" tube. A detailed description of this instrument is given. It is accordingly possible to make the reading not only in terms of the voltage necessary to induce a certain current flow, but also in ohms as the resistance against the current flow which varies with the test voltage.

Before the construction of this test apparatus, a detailed investigation was made of the associated factors such as current flow resistance, induction, etc. by

means of an oscillograph and electro-acoustical methods. By means of this instrument the following conditions for the testing of anodized surface films have been standardized by the Italian Instituto Sperimental dei Metalli Leggeri:

Test current	100 microampères
Contacts	Two contact spheres of 6 mm. diameter
Contact loading	100 grams

### Significance of Etch Figures with Etching and Chemical Polishing of Aluminum

A. Politycki and H. Fischer; *Zeit. fuer Elektrochemie*, vol. 56 (1952) p. 326.

By means of electron microscopic examination it is shown that the etch degraded structure of high purity aluminum does not always lead to the exposure of a cubic structure. With the use of aqueous hydriodic acid the structure occurs as is required by theory for the structural degradation of the oxide-free metal.

### Anodic Polishing of Brass and Copper

H. Muehlberger; *Zeitschrift fuer Metallkunde*, vol. 43, p. 142.

Various factors influencing the electropolishing were investigated by the author and the most favorable conditions for the electropolishing of brass and copper were ascertained. From this work it was confirmed that the formation of a viscous film at the anode is important for the polishing and that a condition of the electrolyte which is as constant as possible as regards its composition must be achieved at the anode. The fulfillment of these conditions is made possible by the precise maintenance of the current-voltage values and by a laminar flow movement of the solution at the anode. Phosphoric acid was used as the electrolyte. The laminar flow of the phosphoric acid in front of the anode was, for brass and copper, the most favorable at 40-60%; for brass the voltage 1.5-1.7 volts and the current density about 15 amp./sq. dm., the bath temperature 40°-60°C. and the polishing period 5 minutes; for copper the voltage was 1.6-1.8, the current density 8-15 amp./sq. dm.; the temperature 35-45°C. and the polishing time 8 minutes.

### Plating Adhesion and Base-Metal Surface Condition

H. Reininger; *Metalloberflaeche*, vol. 6, No. 9, pp. B129-B137.

Sufficient attention is not paid on the part of the metal plater to the fundamental fact that the adhesion and so the quality of an electroplate depends to a large extent, other things being equal, on the nature and condition of the base metal surface. The result of every surface treatment of metallic materials is decisively influenced by the surface condition of the base metal. In the case of cast iron, edge-hard surface zones, coarse graphite and pore-inducing oxide inclusions are harmful. With almost all cast materials but also with soldered and welded parts, oxide inclusions produce local faults in the structure which are relatively harmless

when present as skins but on the other hand present a porous base ground when present as burnt or spongy aggregations. The normal washing, covering and fluxing agents usual with melting, soldering and welding can give rise to hygroscopic salt inclusions in the material structure with unsuitable composition and incorrect application which in turn leads to surface exudations and corrosions. Gas exudations can ruin whole surfaces by pitting and hollow spaces. In the case of light metals which have been heat treated by the salt bath process, the surface quality can be completely destroyed by boil eruptions. Fine piping channels form structural pinholing, in a similar manner to gas pores but generally however not to the same extent. The causes of these faults, their harmful effect on subsequent surface treatment such as plating as well as measures for their avoidance are discussed in detail.

Regarding cast iron, two types are generally processed for surface treatment; these are the very hard variety which cannot be machined but has to be ground and the machinable soft ferritic and the harder perlitic types of cast iron. The hard quality is also commonly designated as white cast iron and the ferritic and perlitic types as gray cast iron. Unsuitable composition or casting measures results in gray cast iron being transformed locally at edges and corners into the white variety. The surface treatment of such edge-hardened cast iron is extremely difficult because for example, plated coatings on the cast iron are varyingly accepted by the surface and this can give rise to a vari-colored appearance of the finished plate. This trouble can be prevented by increasing the silicon content of the cast iron in the foundry.

The graphite content and its nature in the cast iron also has influence on the plating properties of cast iron. From the plating viewpoint a cast iron low in graphite is to be preferred to a cast iron higher in graphite because the graphite exists in the cast iron without any self-strength, as a special phase. The graphite exists in the cast iron in many forms, such as striated, nodular, as plates, spherical graphite, etc. So long as the size of these various macro-forms is limited and thus the graphite is present in the fine form, as is the case with strongly superheated cast iron, the surface density of the cast iron is not influenced. With the presence of coarse graphite, the surface cavities increase. With a plated coating on such a surface, it can be found that the plate can wander into these cavities; this was found to be the case with a nickel plate. A further cause of trouble is that with a coarse-graphite cast iron, the bath solution during the course of the plating, can be absorbed into the porous cast iron by a capillary effect and then remains under the plated coating, giving rise subsequently to "submerged corrosion." Local pitting and flaking of the plated coating on the cast iron is the final result.

On the other hand a coarse plate-like graphitic inclusion is particularly characteristic of soft, ferritic cast iron. The foundry consequently producing a quality cast iron intended for plating is faced with a dilemma. On the one hand the cast iron should be impelled by a sufficiently high Si content to solidify in the ferritic condition, which leads to the avoidance of edge hardening. On the other hand, however, a more

or less coarse graphitic structure results. The practice adopted in foundries producing sole plates for electric irons which are nickel plated and pistons for i.c. engines which are plated, is as follows. As a high Si and C but low sulfur cast iron does not give edge hardening even with rapid cooling, the melt is poured into permanent cast iron molds and in the rapidly cooled outside zones, the known graphite-eutectic dendritic structure is formed with extremely fine graphite separation.

Oxide inclusions occur with many metallic materials as a characteristic of imperfect preparation. The nearer they are to the surface the more they disturb surface processing of the metal; if they break through the surface they show up either as a scab or give a fissured structure according as to whether the inclusions are located vertically or horizontally with respect to the surface treatment. The greater is the affinity of any particular metal to oxygen, the greater is the possibility of oxide inclusions in the metal, formed during melting, casting, etc.

#### Plated Hard Chrome for I. C. Engine Cylinders — Comparative Running Behavior Compared with Other Treatments

H. Wiegand and G. Schaeffeler; *Metalloberflaeche*, vol. 6, No. 9, pp. A129-A133.

The trouble-free running properties and service life of an i.c. engine depend to a large extent upon the co-ordinated action between the cylinder, pistons and piston rings and the fundamental requirement for satisfactory working together between these various parts is the maintenance of a lubrication film on the running surface of the cylinder which is as undisturbed as possible. For the suitable formation of such a film, in addition to the shape of the particles and their design characteristics, the surface quality and particularly the special surface properties, to a great extent also the type of surface and the surface treatment of the material used are decisively significant.

To reduce wear, various measures are adopted for surface treatment of the piston rings, comprising phosphatizing, oxidizing, tinning or lead coating and the more modern treatment of hard chrome, which can be of the mechanically or chemically etched porous chrome type, matt-chrome which again is conducted either with a plane or an undulating surface. Recently, a phosphatized surface produced by a special process by a particular formation of the phosphate crystals has been claimed to give very good running properties. Surface processing by the above methods does produce a wear reduction which is particularly noteworthy with hard chrome treatment of the piston rings. With high duty engines, however, these measures in themselves are not sufficient to keep wear down over a reasonably long period and this accordingly necessitates giving the cylinder surface itself in turn a special wear-resisting treatment.

There are various methods possible for the processing treatment of the cylinder walls comprising case hardening, nitriding, induction hardening and hard chrome plating. Hard chrome plating for increasing the wear resistance of the walls of i.c. engine cylinders

was first developed during the war and was applied extensively in connection with the series production of aircraft engines. The various treatments to ensure adhesion of the oil film on the hard chromium plate are now well established processes and it will suffice to say that experience has shown that the "porous" chrome plated cylinder walls have been extensively applied with success to automobile engines but have not been found suitable for heavy duty high power engines. Also with air-cooled aero engines, no satisfactory results were obtained with "porous" chromium plate. Roughening the hard chrome plate with a jet blast so as to give a sufficient pore-like deepening to provide oil retention was also found to fail with aero engines.

It was found however that the previous jet-blasting of the surface to be chromed before the plating, with steel shot or sand so as to create "cratering" was an improvement. Naturally it is difficult to obtain a uniform distribution of the crater effect on the surface. This work was developed and the surface marking was produced uniformly by means of a knurling tool. These surface depressions according to requirements are produced deeper or more shallow and in greater or smaller number and the surface effect produced remains after the chrome plating and even with maximum cylinder operational demand the requirements for an homogeneous oil film are complied with. The chromium growth which tends to build up round the edges of the depressions can be removed by subsequent grinding or post-honing of the surface. Careful surface cleaning is necessary after the knurling and prior to plating to ensure that no metal grit is present which would tend to cause the build-up of chromium. This could cause subsequent flakes of chromium peeling away which would lead to wear in turn of the pistons and piston rings. This grit can also lead to macro-pitting in the chromium plate which would cause an undesirably high oil consumption in the engine.

Hard chrome plated aero engines resulted in the service life of the engine being increased four times over the non-chrome plated engine. Apart from wear resistance properties, the hard chrome plated cylinder surface possesses a considerably higher corrosion resistance than the non-treated steel surface or a nitrided, case hardened or induction hardened steel surface; this all the more as in aero engine fuels, anti-detonating dopes are used whose combustion residues are strongly corrosive. The necessity for using corrosion-protective oils for this reason disappears when hard chrome plated cylinders are used. Also with light metal cylinders, the advantages of these are developed to the full with hard chrome plate without the necessity of using hardened steel or cast iron sleeves, with which it is difficult to obtain a satisfactory heat transfer factor so essential for this type of air cooled engine. With satisfactory plating conditions the adhesion of the hard chrome plate on steel or light metals is good. With a faulty chrome plate a fresh plate must be applied after dechroming. When dechroming care must be taken that the process is stopped at the right time, otherwise the cylinder surface would be scarred, the subsequent chrome would again be faulty and the cylinder ruined.

## Shop Problems

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

### Stripping Silver from Brass

**Question:** I would like to know if there is any way to strip silver plating from brass (samples enclosed) without pitting the brass. I have tried reverse current in a cyanide solution, but the brass pits too much.

W. J.

**Answer:** Silver can be removed from brass effectively and without attack of the base metal by immersion at about 175°F. in a mixture of 10-19 parts sulfuric acid to one part nitric acid by volume.

No current is employed but the parts should be dry since moisture in the strip will result in attack on the brass. Lower temperatures than 175°F. may be used but the action is slower.

### Control of Brass Passivator

**Question:** In our plant we are producing brass ammunition components, the specifications for which require a chromic acid passivation treatment.

We are processing more than 5,000 pounds of components per day and although our experience since putting this process into operation a few months ago has been more or less favorable, we have been unable to obtain any recommendations or suggestions of a clear-cut process for checking the condition of the passivating solution and determining what additions to make in order to maintain proper operating conditions. The solution we are using is made up of chromic acid and sulphuric acid.

We would appreciate it very much if you would tell us where we might obtain some reference material or publications pertinent to the chromic acid passivation process or put us in touch with an organization that may contribute to the solution of our problem.

R. G. C.

**Answer:** We know of no references on the control of dichromate type passivators for brass. However, since there is very little decomposition of the solution in use, while the drag-out losses are quite high, replenishment with the original ratio of chromic acid and sulfuric acid is ordinarily satisfactory, employing a hydrometer for concentration control.

If you wish to control the solution by chemical analysis, standard procedures for hexavalent chromium and sulfate may be used.

### Insoluble Anodes in Sulfuric Acid Solutions

**Question:** We are presently working on the following research problem. Pickling liquors are treated with ion-exchange resins in order to recover copper and zinc in regenerated sulphuric acid solutions. To recover pure electrolytic copper and zinc from these solutions, we are facing difficulties in finding insoluble anodes. Do you believe that graphitic anodes would be suitable for this type of work?

Any suggestions you could make regarding proper insoluble anodes and electrolytic conditions would be greatly appreciated.

J. K.

**Answer:** The literature shows quite a few alloys suggested for use as insoluble anodes in acid sulfate solutions. If no acids are present which form soluble lead salts, lead alloy anodes would be most suitable. Tainton (Eng. Mining J., Dec. 1, 1928) employed a lead alloy containing 1% silver for acid sulfate baths. The Chilex anode of Fink (U. S. Pat. 1,441,157-8), used for copper electrowinning, contained copper, silicon and iron, in addition to the lead. Other alloying metals are silver plus copper patented by Isher-

wood for acid zinc solutions (U. S. Pat. 2,602,775), lead plus 3½% thallium and lead plus tin and cobalt.

If graphite anodes are used, disintegration should be expected, which will result in fine particles floating in the solution. Unless the graphite anodes are bagged, the deposited copper and zinc would be contaminated with carbon after a while.

### Plating for Rubber Adhesion

**Question:** We have an inquiry in connection with tire bead wire, asking for information on the following points:

1. What proportion of copper and tin is best for coating the tire bead wire with bronze.
2. Should this be applied electrolytically or by the hot-dip process.
3. What composition is best in the bronze to produce adhesion between the rubber and the bronze.



Recently Granted Patents  
in the Metal Finishing Field

## Patents

### Jewelry Cleaner

*U. S. Patent 2,627,276. Feb. 3, 1953.  
C. E. Eggleton, assignor to Glit-O-Ring,  
Inc.*

A jewelry cleaner comprising a container having a cleaning fluid therein, a cover for the container comprising top and cylindrical wall portions, a disk fitted into the cover against the top wall portion thereof, and having one end of an elongated element or rod secured thereto, a second disk of fibrous moisture-proof material fitted into the cover and overlying said first mentioned disk, the diameter of said second disk being at least equal to or slightly larger than the inside diameter of the cylindrical wall portion of the cover whereby its marginal edge will frictionally engage said cylindrical wall portion of the cover to thereby inseparably secure said disks in the cover, a stem having one end removably secured to said rod element whereby the stem may be detached from the cover, and a plurality of hook elements mounted on the stem for supporting articles of jewelry within the container, and whereby such articles may be submerged in the cleaning fluid when the cover is applied to the container.

### Rust Preventive

*U. S. Patent 2,627,474. Feb. 3, 1953.  
J. W. Romberg, assignor to The Texas  
Co.*

A quick drying liquid composition adapted for application to metal surfaces to prevent rusting that comprises as essential ingredients about 40-50% by weight of a waxate consisting of a wax-soap composition composed of metallic soaps of the acids of oxidized paraffin wax and the associated non-acid constituents thereof, about 5% by weight of petroleum cylinder stock as plasticizer, about 45-55% by weight of naphtha and a relatively minute portion of the order of 0.001-0.1% by weight of liquid dimethyl silicone effective to decrease the drying time of the composition when applied to metal surfaces, said composition being adapt-

ed upon the volatilization of the naphtha to leave a non-tacky, adherent film on the metal surface.

### Sander Head

*U. S. Patent 2,627,705. Feb. 10, 1953.  
G. W. Bruner, assignor to Anton  
Vonnegut*

A sander head comprising a hub and spaced side supports, an annular series of applicator segments mounted in spaced relation about the periphery of said supports for individual and restricted radial sliding movement, a corresponding annular series of rollers carried by said supports inwardly of said segments toward said hub, and an endless abrasive belt passing alternately about corresponding rollers and segments respectively movable thereover to present an annular series of individual separated abrasive surfaces.

### Hot Dipping

*U. S. Patent 2,628,393. Feb. 17, 1953.  
A. P. Knapp, assignor to Knapp Mills,  
Inc.*

An apparatus for coating metallic objects comprising the combination of a container adapted to contain a molten pool of material, means for heating said container and material, a raft within said container having apertures therethrough adapted to float in said molten pool, means for moving said raft down into the container to at least partially submerge it in the molten pool and for controlling the rise thereof in said molten pool, and means having a portion extending above the raft for transferring molten material from said molten pool to a position above said raft.

### Abrasive Blasting Machine

*U. S. Patent 2,628,455. Feb. 17, 1953.  
R. S. Webster, assignor to The Hydro-  
Blast Corp.*

Cleaning apparatus for castings and the like comprising a supporting structure including spaced vertical track members, a horizontal beam mounted on the track members for vertical movement thereon, means including a

reversible electric motor to move the beam vertically, a carriage mounted on the beam for horizontal movement thereon, means including a reversible electric motor to move the carriage on the beam, a nozzle on the carriage, pairs of control switches for controlling the motors respectively, and a single operating handle engageable with the control switches and movable in different planes to control the respective pairs of switches.

### Sandblasting Device

*U. S. Patent 2,628,456. Feb. 17, 1953.  
R. R. Berg, assignor to Mariblast  
Corp.*

An abrasive gun comprising a hollow frusto-conical shaped hood having means forming a central opening at the apex thereof, said hood being open at its base, means forming spaced openings extending through the body of said hood, nozzles mounted in said hood each having an outlet opening aligned with one of the spaced openings extending through said hood, said nozzles being mounted so as to direct abrasive supplied thereto toward the central axis of said hood in a direction generally toward the hood base, and means for removing the material through the apex opening of the hood.

### Vapor-Phase Corrosion Inhibitor

*U. S. Patent 2,629,649. Feb. 24, 1953.  
A. Wachter and N. Stillman, as-  
signors to Shell Development Co.*

A substantially solid inactive material having physically incorporated therewith an effective vapor phase corrosion-inhibiting amount of a non-aromatic amine salt of a carboxylic acid, the amine portion of said salt having not greater than about 35 carbon atoms therein.

### Sand Blast Nozzle

*U. S. Patent 2,628,457. Feb. 17, 1953.  
G. Kroll and L. Handelman.*

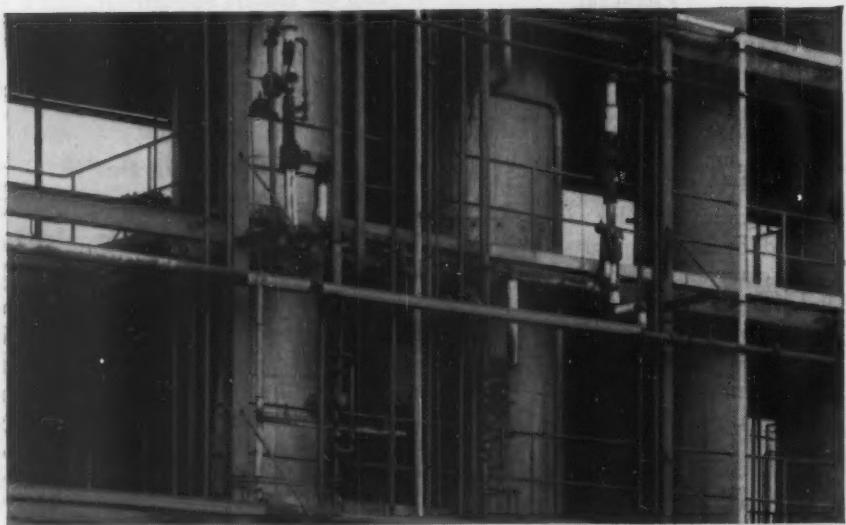
A sand blast nozzle in combination with a flexible tube, the nozzle comprising a frusto-conical body of hardened clay, the body having a frusto-con-

INDUSTRIAL LIBRARIES



# ETHYL BENZENE REACTORS LINED WITH CORROSION- RESISTANT SARAN RUBBER

Another example of how SARAN RUBBER tank lining helps cut cost of handling, storing or transporting corrosives



The ethyl benzene reactors pictured here have a saran rubber lining under one course of chemical brick. The reactors handle  $\frac{1}{3}$  ethyl benzene,  $\frac{1}{3}$  higher benzenes,  $\frac{1}{3}$  benzene and .3% hydrochloric acid. They have been in service for over three years without appreciable effect on the saran rubber lining in spite of the fact that they operate at a temperature of  $110^{\circ} \text{ C}$ .

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ment handling corrosive acids, solvents, and other chemicals.

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## RELATED PRODUCTS

Saran rubber molded parts—stoppers, diaphragms, various-sized moldings for valves, instruments, etc.

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ical bore formed therethrough and an outwardly directed integrally formed flange at one end, a porcelain lining disposed in the bore and a resilient lining disposed over the porcelain lining, the resilient lining being turned over the flange at one end and further being turned back over the hardened clay body at the opposite end, and means for releasably securing the flanged end of the body to one end of the flexible tube.

## Method of Cleaning Strip

*U. S. Patent 2,628,924. Feb. 17, 1953.  
S. S. Johnston and J. E. Elswick,  
assignors to National Steel Corp.*

In the process of removing a solution of electroplating salts from a moving metal strip electroplated with metal, the steps of directing the strip along a predetermined path with one surface uppermost and directing a stream of fresh wash water downwardly onto said one surface, changing the direction of strip travel and positioning the other surface uppermost and directing a stream of fresh wash water downwardly onto said other surface, and thereafter passing the strip between wringer rolls.

## Bright Dip for Cadmium and Zinc

*U. S. Patent 2,628,925. Feb. 17, 1953.  
C. W. Ostrander, assignor to Rheem  
Mfg. Co.*

An aqueous acidic solution for treating metals selected from the group consisting of zinc and cadmium and alloys thereof to impart a bright colorless surface to the metal consisting essentially of chromic acid 10 grams per liter to 320 grams per liter, sulfuric acid and acetic acid, the chromic acid and sulfuric acid being present in the ratio of about 1 cc. per liter of sulfuric acid to about 16 grams per liter of chromic acid, the acetic acid being present in amount of about 25 to about 200 cc. per liter.

## Buffing Wheel

*U. S. Patent 2,629,212. Feb. 24, 1953.  
G. A. Lyon.*

A surface-treating assembly comprising a first core section having an axial aperture therethrough and an axially extending upwardly inclined surface that has a highest point adjacent one end face of said first core section, an elongated strip of surface-treating material, means for securing one end of

said material to said first core section at a point spaced from said one end face, a second core section having an axial aperture arranged to be aligned with the aperture of said first section on a common spindle, said second core section having an axially extending upwardly inclined surface with the highest point adjacent the end face of the second core section that abuts said one end face of said first core section, means for securing the other end of said strip on said second section adjacent the low end of said surface.

#### Corrosion Inhibitors

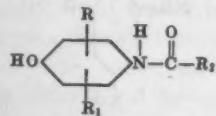
U. S. Patent 2,629,676. Feb. 24, 1953.  
C. F. Prutton, assignor to The Lubrizol Corp.

A corrosion inhibitor for metal surfaces comprising the combination of an oil-soluble organo-metallic phosphide, which compound has a metal substituent solely attached to phosphorus and contains at least one organic radical selected from the class consisting of hydrocarbon and halogen-containing hydrocarbon radicals, and a non-aqueous oil vehicle.

#### Rust Preventative Composition

U. S. Patent 2,629,666. Feb. 24, 1953.  
A. J. Morway and D. W. Young, assignors to Standard Oil Development Co.

A rust preventative composition consisting essentially of an asphalt which has been thickened to a grease-like structure with 0.5% to 6.0% by weight of a material having the formula:



wherein R and R<sub>1</sub> are selected from the class consisting of hydrogen and alkyl groups containing from 4 to 15 carbon atoms and R<sub>2</sub> is an alkyl group containing from 4 to 22 carbon atoms.

#### Emulsion Cleaner

U. S. Patent 2,629,696. Feb. 24, 1953.  
S. R. Dodd and E. J. Ainsley, assignors to Oakite Products, Inc.

A water dispersible stable acidic emulsion in the form of a gel comprising phosphoric acid, a water insoluble organic solvent emulsified with a non-ionic emulsifying agent, a water soluble organic acid which is normally solid at room temperature in an amount effective to improve rust removal by the composition and a quantity of a

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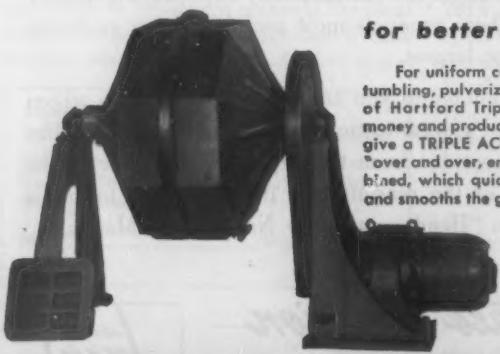
Let our polishing engineer demonstrate Kold-Grip for you, or send for free sample, telling us the metal to be polished, grain sizes to be used, and drying facilities available. We can help you if we hear from you.

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water soluble polyhydroxy organic compound free of acid radicals sufficient to prevent the water soluble organic acid from crystallizing out of the emulsion, said water soluble organic acid being soluble in said polyhydroxy compound to give a solution which is at least semi-liquid, said emulsion being essentially water free.

### Vapor-Phase Corrosion Inhibitor

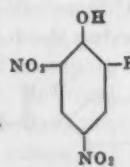
U. S. Patent 2,630,368. March 3, 1953.  
A. Wachter and N. Stillman, assignors  
to Shell Development Co.

In a method for inhibiting corrosion of a ferrous metal normally可腐的 by contact with vapor and oxygen, the step of forming, in the immediate vicinity of said metal, and subjecting said metal to an atmosphere containing a corrosion-inhibiting concentration of vapors of a nitrite salt of an N-heterocyclic organic base, said heterocyclic base having at least 5 atoms in the ring structure thereof, said nitrite salt having a vapor pressure of at least 0.00002 mm. Hg at 21°C., said atmosphere, upon dispersion in water, yielding a solution having a pH value of at least about 6.

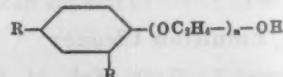
### Corrosion Inhibition

U. S. Patent 2,630,380. March 3, 1953.  
W. J. Hanson and R. W. Nex, assignors  
to The Dow Chemical Co.

A composition of matter comprising (1) a dinitro-alkyl-phenol of the formula



wherein R represents an alkyl radical containing from 3 to 5 carbon atoms, inclusive, and (2) as a corrosion inhibitor therefore an aryloxy polyethylene glycol of the formula



wherein R represents an alkyl radical containing from 3 to 5 carbon atoms, inclusive, and n is an integer from 8 to 16, inclusive.

### Method of Cleaning and Descaling Ferrous Bodies

U. S. Patent 2,630,393. March 3, 1953.  
C. B. Francis.

In a method of descaling stainless steel articles, the steps including im-

mersing them in a fused bath composed almost entirely of a mixture of an alkali metal nitrate and an alkali metal hydroxide with an addition of from 1 to 3% of an alkali metal oxide containing at least two atoms of oxygen per molecule and effective as an oxidizing agent at temperatures below 800°F., and maintaining said bath at a temperature of from 600 to 800°F.

#### Process of Applying Reaction Plating

*U. S. Patent 2,631,949. March 17, 1953. S. Kronthal.*

Process for producing a plating reaction and depositing a metal or alloy plate upon a selected surface independently of the chemical nature of the latter, which process consists in initially bringing together from separate material supplies into reacting association upon the selected surface, water with a strong base of at least one of the alkali metals and at least one weak acid of the class consisting of anhydrous boric acid, free uncombined silicic acid and free phosphoric acid to form a local solution ranging from a 1% concentration to saturation, and a simultaneously applied supply of finely pulverized metal of a fineness of at least 200 mesh per inch to react with the resulting solution formed upon said selected surface and plate metal directly on the latter.

#### Pickling Composition

*U. S. Patent 2,631,950. March 17, 1953. M Rosenfeld and C. F. Pickett.*

A composition of matter for removing iron rust and scale from metal surfaces comprising oxalic acid and hydrolyzable chloride of trivalent metal selected from the group consisting of iron and aluminum, the mole ratio of oxalic acid to hydrolyzable chloride being within a range not substantially greater than 96.5 to 3.5 and not substantially less than 83.6 to 16.4.

The process of removing iron rust and scale from metallic surfaces which comprises supplying thereto a solution containing oxalic acid and a hydrolyzable chloride of a trivalent metal selected from the group consisting of iron and aluminum, the mole ratio of oxalic acid to hydrolyzable chloride being within a range not substantially greater than 96.5 and 3.5 and not substantially less than 83.6 to 16.4, and maintaining a prolonged contact between said solution and said surfaces at an elevated temperature.

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## Recent Developments

New Methods, Materials and Equipment  
for the Metal Finishing Industries

### Wide Swing Polishing Lathe

*Hammond Machinery Builders, Inc.,  
Dept. MF, 1600 Douglas Ave., Kalamazoo, Mich.*



The above company announces a new 10 HP Model 10 VROW wide-swing variable speed polishing and buffing lathe, as illustrated.

This new lathe has extended spindle affording maximum working area around the wheels and has a variable spindle speed range of 1,500 to 3,000 rpm. The speed is instantly changed by dial control while machine is running.

The increased demand for a heavier variable speed wide swing lathe prompted Hammond to add this model to their wide line of polishing and buffing equipment.

### Addition Agent for Acid Pickling

*The Mitchell-Brown Chemical Co., Dept. MF, 2446 Main St., Stratford, Conn.*

Black Magic "Pik-Aide" is a chemical solution which is added to hydrochloric, sulphuric and nitric acid pickling solutions to produce a brighter, uniform, faster and more economical pickling action with a minimum of attack on base metal.

It is added to in the proportions of 2½ quarts "Pik-Aide" to 100 gallons of pickling solution.

The use of this new product in an acid pickling solution is claimed to have the following advantages.

1. Eliminates pitting action on base metal resulting in a clean, bright surface after pickling.

2. Reduces acid consumption be-

cause of faster and more complete draining of acid pickle solution.

3. Makes rinsing more thorough and complete.

4. Will add cleaning action to acid pickle and remove any soils not previously removed before pickling.

5. Is non-toxic and non-inflammable.

6. Minimizes attack on base metal resulting in savings of acid consumption.

Information and literature is available on request.

### Polyethylene Valves

*American Agile Corp., Dept. MF,  
P.O. Box 168, Bedford, O.*



1" and 2" bore valves, made throughout of polyethylene, and of newest design, are announced by the above manufacturer.

These valves, known as Agilene valves, are extremely light in weight (2" valve weighs less than 6 pounds) and resist hydrofluoric, sulfuric, nitric, and hydrochloric acids at temperatures up to 160 deg. F.

These valves are furnished with standard drilled flanges for easy incorporation into existing installations or for use in new pipe line assemblies.

### Black Salts for Ferrous Metals

*Du-Lite Chemical Corp., Dept. MF,  
Middletown, Conn.*

A new ferrous metal blackening compound known as Dulite 3-O Black,

has been introduced by the above company.

Particularly effective for stainless steels, this compound will produce a non-fading black finish quickly and easily on malleable iron, etc., as well without the need for special equipment.

The operating temperatures required for processing are exceptionally low, the maximum involved being 240°F. The compound is supplied in dry salts form which may be mixed as needed, eliminating the inconvenience and danger of carboys and liquid chemicals.

### Plastic Glove

*Edmont Mfg., Co., Dept. MF, 1276 Walnut St., Coshocton, O.*

Brand new this year is a heavy duty plastic coated work glove that outwears regular plastic as much as 2 to 1. The new coating, called Durox, is used exclusively for Edmont's new Grappler line. It is produced by impregnating their regular plastic coating with a special compound. The result is a tough-tempered, long wearing coating that many say looks and feels a lot like leather.

In addition to its extra long wear, it has remarkable wet-grip qualities that make it outstanding for handling

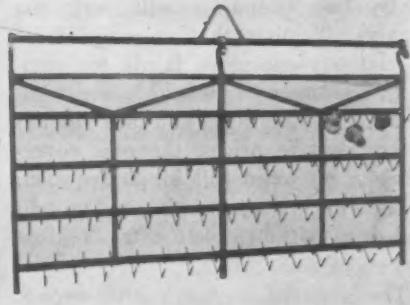
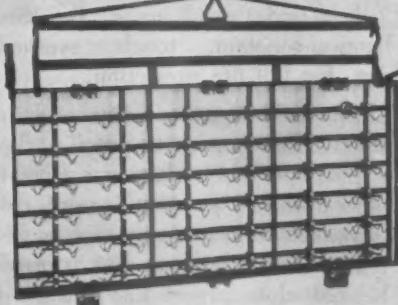
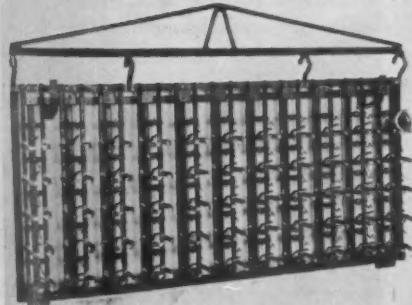


materials or tools that are coated with oil, grease or other slippery agents.

Four styles are available in this new line—a 12" fully coated gauntlet, fully coated knitwrist, palm coated knitwrist and palm coated safety cuff. The fully coated styles are made on the curved-finger, wing-thumb pattern with preflexed finger joints. The No. 363 12" gauntlet is illustrated.

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TIPS GIVING YOU THE FINEST WITH THE  
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one at the top and the other at the bottom.

All strain points are bar-tacked for extra strength. Full rolled seams, double stitched with strong Vynon-N thread, will not unravel.

### Strippers

*Oakite Products, Inc., Dept. MF,  
118 Rector St., New York 6, N. Y.*

The above manufacturers of industrial cleaning and allied materials have announced the development of two new paint strippers, Oakite Composition No. 56 and Oakite Composition No. 57, designed respectively for tank immersion stripping and brush-on stripping of a wide variety of alkaline-resistant paints and lacquers.

Composition No. 56, the manufacturers report, is a thin-bodied solvent, neutral in character, having a pH of 7. It is non-flammable, and contains no phenols, cresols, acids, or alkalies. Designed for immersion stripping of urea-formaldehyde, alkyd, phenolic and urea-melamine finishes, lacquers, varnishes, wrinkle finishes and vinylite resins, material is used at full strength and unheated, with parts to be stripped immersed for periods of time which will vary depending on the type of paint, number of coats, age, etc. Some finishes will wrinkle and rinse off in sheets with a pressure rinse after application of Composition No. 56, others will soften to the point where they can be scraped or brushed off. Used as recommended, Composition No. 56 is said to be safe on steel, brass, copper, zinc, magnesium and aluminum.

### New Coveralls

*Filtration Fabrics Division, Filtration Engineers, Inc., Dept. MF, 155 Orton St., Newark 4, N. J.*

Made of a new lightweight, tough, acid and alkali-resistant Vynon-N fabric, these new Feon chemical resistant coveralls are aimed to fit the working man while he's working, not just while he's standing still, say the makers. Though they're made from a relatively expensive fabric for complete resistance to chemicals and commercial launderings, and are offered at competitive prices, the new coveralls are cut extra full for active men. Pleated back, deep armpits, and crotch, and deep pockets create extra comfort and roominess.

The material is tough and strong,

yet is cool, smooth, and is never stiff or scratchy. Admiralty gray in color, it will not show dirt readily. The fabric is not affected by concentrated mineral acids and alkalis, and has very high resistance to a wide variety of inorganic acids, bases, and salts. It resists the temperatures and strong reagents used by industrial laundries. It is also immune to bacteria and mildew. Pockets and thread are of the same chemical-resistant, tough, synthetic fiber, for full life protection.

Features for extra convenience include two breast pockets, pencil pocket, two side pockets with access slots to inner pockets, two double-reinforced hip pockets, and a roomy tool pocket. The coveralls have snap-cuff trousers. The full zipper front has two pulls,

num, and may also be used on wood since it doesn't tend to raise the grain appreciably.

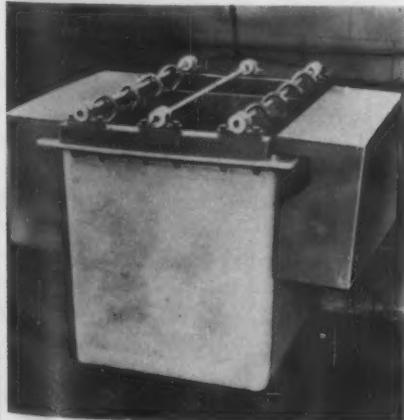
The second of these materials, Oakite Composition No. 57, is a viscous solvent intended to replace combinations of non-viscous solvent detergents and thickeners when stripping finishes from vertical and inverted surfaces of equipment. It is non-flammable and, like Composition No. 56, contains no phenols, cresols, acids or alkalies. It can be applied safely on all metals at full strength by brush-on method, and is allowed to soak on surfaces until paint wrinkles or softens. Paint is then hosed or scraped off. Many phenolics, alkyds, ureas, vinyls, varnishes and lacquers are readily removed by this material, the manufacturers report, while some finishes may require more than one application. When work stripped with either Composition No. 56 or Composition No. 57 is to be repainted, the manufacturers recommend thorough rinsing to remove all stripping material, since any solvent stripper film remaining on surfaces will prevent proper adhesion of new paint coat applications.

A special service report providing additional information regarding these materials and giving helpful recommendations for obtaining maximum benefits with their use is available from the company without cost.

#### Fiberglas Plating Tank

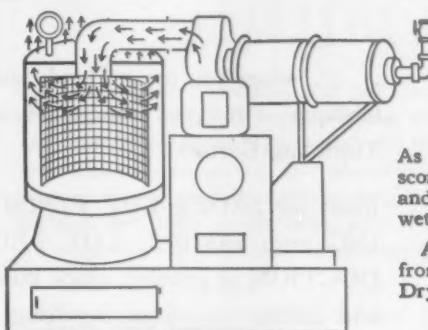
Hanson - Van Winkle - Munning Co.  
Dept. MF, Matawan, N. J.

The above company offers a new seamless Fiberglas tank for use with all solutions generally used in the plating field with the exception of caustic cleaner and hydrofluoric acid. Fiberglas tanks cost from 5 to 29% less than lined steel tank and are equally impervious to chemical attack.



METAL FINISHING, June, 1953

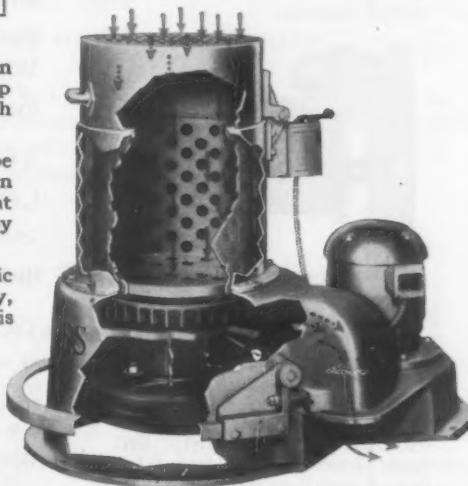
## EVER BLOW INTO AN ASH TRAY?



If you did, you saw a practical demonstration of the principle of air deflection. In old type dryers, air blown in from the top is deflected by the top layer of parts.

As one user put it, "the top layer gets scorched, the next layer is nice and dry, and from there on down the parts are still wet".

A powerful suction fan draws the air from the bottom of the modern Nobles Dryer. Fresh air rushes in from the top



to fill the vacuum and is drawn through the entire contents from top to bottom where it is expelled with the water.

Steam or electric heaters may be mounted compactly in the cover in contrast with space consuming, heat wasting, separate units connected by pipe.

An internal expanding, hydraulic brake stops the machine smoothly, and quickly. The "brake pedal" is a ring extending around the entire working area so that the machine can be stopped instantly from any working position. In the interest of faster drying and lower costs write today!



WRITE FOR  
**FREE** Folder

Temperatures of tank contents may be as high as 220°F. Tanks can be furnished in any size required. Fiberglas mat is impregnated with Vibrin resin and actually custom molded to the exact size desired by the customer. Standard finish is gray.

#### Rust-Inhibiting Metal Cleaner

Whitfield Chemical Co., Dept. 22-A,  
14225 Schaefer Highway, Detroit 27,  
Mich.

The product, it was stated, is being marketed as a multi-purpose cleaning agent — for use in mechanical power washing equipment for removing oil, dirt, chips, and abrasives from all types of metal surfaces. Other uses include: cleaning before phosphatizing; maintenance cleaning of paint; wetting out

of dust and paint overspray; conditioning hard water to prevent scale or rust in mechanical washers, steam equipment, and grinders.

The compound may be applied in power washers, tanks, or spray booths at concentrations of  $\frac{1}{2}$  to 4 ounces per gallon of either hot or cold water. Rinsing after cleaning is not necessary, though with some applications it might be advantageous.

Dust-free, granular, and water soluble, the compound is low foaming, preventing lime scale deposition.

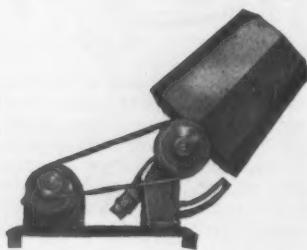
#### Gold Colored Aluminum

Miracle Finishes, Inc., Dept. MF,  
10 Water St., Brooklyn 1, N. Y.

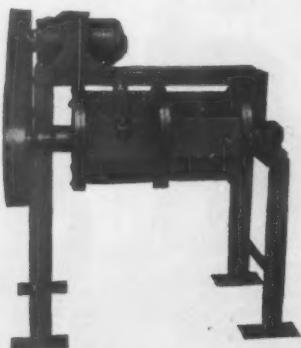
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ON SMALL JOB LOTS

## FINISHING COSTS TUMBLE



**TIFF-TYPE BENCH MODEL** — motor or belt driven. Adjustable elevation. Steel, wood, rubber lined or alloy metal barrels.



**HORIZONTAL FLOOR MODEL** — light duty for bulk tumbling and burnishing of small parts.

Since 1880 Designers and Builders of Tumbling Barrel Equipment.

**THE HENDERSON BROS. COMPANY**  
135 SOUTH LEONARD ST. WATERBURY 85, CONN.

for aluminum have opened up with the recent introduction of a new process called D'orium. Licensed to Miracle Finishes, Inc., exclusively in the United States by Coloral, S. A. of Switzerland, it gives aluminum a gold finish which is so realistic that it is almost impossible to detect the difference by eye alone between it and genuine gold. Six shades of gold can be achieved, as well as many other colors, all of which have a high luster and are non-corrosive. The finish will not tarnish or discolor and since it is an integral part of the metal itself it can't chip, peel or crack.

Through D'orium, aluminum can now be used in hundreds of places which heretofore called for heavier or expensive metals. In addition, its cost is low enough to encourage wide

. . . . when you use a Henderson Oblique Tilt-type Bench Model Tumbling Barrel.

Ideal for **SMALL-LOT FINISHING** and **SAMPLE LOT PRODUCTION** of jewelry, clock parts and similar products requiring a *quality finish at minimum cost*. Widely used in laboratory experimental work.

**ALSO HORIZONTAL TUMBLING BARRELS** — both light and heavy duty for small-lot and quantity production.

Tumbling barrels for every purpose or, made to order to meet your special requirements.

*Write now for further information.*

use in many, many industries. No gold is used to obtain this lifetime finish.

### New Rubber Cushioned Abrasive Textures

*Brightboy Industrial Div'n., Weldon Roberts Rubber Co., Dept. MF, Sixth Ave. and N. 13th St., Newark 7, N. J.*

A new series of rubber cushioned abrasives has been announced by the company to round out the Brightboy line, hitherto made in Standard, Tuff-tex and Fine-tex. The growing demand for rubber cushioned abrasives has brought with it the need for new textures to supplement the three established textures, and to solve many specialized finishing problems arising from new methods and materials.



The new series, known as the Brightboy BL series, is now available in three grades: 54BL, coarse; 70BL, medium, and 120BL, fine. All textures are made in a variety of sizes in wheels, discs, sticks, rods, cylinders, tablets and blocks for machine and manual use. They work to close tolerances and can be shaped to contour.

The BL series features a new rubber binder, carefully compounded with abrasive grain, to achieve a tough rubber cushion for the evenly blended abrasive. The company reports that trial of these new textures in industry indicates many new uses for rubber cushioned abrasives in burring, finishing and polishing operations. The new textures have been particularly successful in removing heavy tool marks from forged aluminum, smoothing weld marks, polishing and burring stainless steel, and in many operations on both hard and soft metals. The manufacturers state that because of its versatility, its applications range far beyond the scope of other finishing methods, frequently performing three operations at once, and speeding production.

### Indicating, Recording and Totalizing Meter

*Simplex Valve & Meter Co., Dept. MF, 68th & Upland Sts., Philadelphia 42, Pa.*

For the accurate measurement of water, gas, air, sewage, sludge or other industrial liquors, the company has developed the Type H-Meter. This mercury flow type indicating, recording and totalizing unit, operates in conjunction with Venturi tubes, flow nozzles and orifice plates. It is so calibrated so as to give a plus or minus 2% accuracy at any point, over flow ranges as wide as 13:1.

To describe and detail all of the

salient characteristics of this meter, Simplex prepared an authoritative 20-page bulletin, No. 401. Descriptions of the meter, including facts on its operation, construction, general information, sizes and capacities, specifications and other pertinent data of interest to consulting plant engineers, purchasing engineers and operating personnel are listed.

#### Control of Dusting Concrete Floors

United Laboratories, Inc., Dept. MF,  
16801 Euclid Ave., Cleveland 12, O.

To aid in the control of dusting concrete floors, the company announces the development of a product expressly designed for this purpose. Known as Transvar 266, the product is claimed to have shown remarkable results in binding tiny dust particles together that are actually a part of the concrete surface. Such dusting is the very first sign of a surface disintegration and if allowed to continue, can result in serious and costly future floor problems. Transvar 266 may be applied by brush or even a mop. It is a thin liquid, light amber in color but does not alter the appearance of the surface due to its deep penetration of the pores. No surface film is formed. It is an especially economical treatment that may be applied to both newly laid concrete and old surfaces as well. In addition, it may be applied equally well to wooden floors to stop the surface from splintering.

#### Table Model Belt Polishers

Porter-Cable Machine Co., Dept.  
MF, Syracuse, N. Y.

The above company announces two abrasive-belt bench grinders. The Model CN 2 has unusual versatility,



# PRE-CLEAN

for a  
Physically  
Clean  
Surface

Remove ALL dirt... buffing and polishing compounds, chips, drawing compounds, etc., in a thorough, one-step cleaning operation that gives you a physically clean surface. For practically all finishing operations except plating and vitreous enamelling, this physically clean surface is adequate. If you plate or enamel, you need a final cleaning operation to get a chemically clean surface. But good pre-cleaning greatly simplifies and speeds up the final cleaning stage in alkaline or in electrocleaning baths.

## PRE-CLEAN for Solid Dirt as well as Oil and Grease

If there's solid dirt on the work, you can't depend on degreasing alone to remove embedded or stubbornly bonded particles. You have to have something more than solvent action on oil or grease. And that's exactly what the Magnus Emulso-Dip Pre-cleaning method provides.

## PRE-CLEAN without Fumes and Corrosion

The Magnusol cleaning solution used in this method does not generate unpleasant or toxic fumes. It has no corrosive or harmful action on any metal. And it gives you the most economical cleaning that exists today.

ASK FOR A PRE-CLEANING DEMONSTRATION . . .  
either in your plant or in the Magnus Pilot Laboratory.



### MAGNUS CHEMICAL CO., INC.

11 South Avenue, Garwood, N. J.  
In Canada — Magnus Chemicals, Ltd., Montreal  
Service Representatives in Principal Cities

performing four distinct types of grinding and surfacing: contact wheel, flexible belt, platen, and contour work. It has a  $\frac{1}{2}$  H.P. motor and uses 2" wide endless abrasive belts of any grit. It can be used vertically, horizontally or at any angle between.

Model BBS is a 1 H.P. heavy-duty, horizontal bench grinder using abrasive belts  $2\frac{1}{2}$ " by 60". The belts which can be quickly interchanged for various grits, keep cool while running over resilient cushioned wheels, and maintain their shape in continuous use.

#### Heavy-Build Protective Coating

United Chromium, Inc., Dept. MF,  
100 East 42nd St., New York 17, N. Y.

Ucilon 454, an air-drying modified vinyl coating that provides a film

three to five times thicker than conventional air-drying vinyls, was introduced at the convention of the National Association of Corrosion Engineers March 16. This coating can be applied by ordinary brushing and spraying techniques. When sprayed, it can produce dry films of 0.003" to 0.005" per coat.

Two coats of Ucilon 454 are sufficient for most applications, this being one to three coats fewer than required for comparable protection from ordinary vinyl protective coatings. It resists acids, alkalies, salts, water, and is especially recommended to protect equipment against petroleum and its derivatives.

Having better adhesion than ordinary vinyls, it can often be used where, because of the poor condition of the

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real  
showing

in your

plating

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**MEAKER**

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Full Automatic and Semi-Automatic Electroplating Equipment  
Strip Steel Plating Equipment • Wire Galvanizing Equipment  
Pickling Machines • Process Conveyors  
Motor Generators and Rectifiers

*Special Machines for the Unusual Requirements*

4483

surface, ordinary vinyl coatings could not be used. Under some circumstances it can be applied directly over rusted and scaled surfaces.

#### Electric Radiant Immersion Heaters

Glo-Quartz Electric Heater Co., Inc.,  
Dept. MF, 37934 Elm St., Willoughby,  
Ohio.



The introduction of the new Glo-Quartz electric radiant immersion heater permits the heating of all acid electroplating, electropolishing, pickling and phosphatizing solutions at all temperatures and concentrations with the sole exception of hydrofluoric acid.

The smooth surfaced, fused quartz sheath is totally inert to all acids and is ideally suited for heating all rust proofing solutions.

The units are constructed with a ground lead and a standard, Underwriters' Laboratories approved, vapor-proof junction box. The junction box, holder and guard have an approved type plastisol covering which is resistant to most electroplating solutions. The guards are also provided with Neoprene covering.

Some of the advantages of the heaters are: they are designed for long life, portability, ease of installation, are extremely light in weight and feature replaceable heating elements that can be inserted into the quartz sheath without removing the heater from the tank. Type FR heaters have midget fuses inside the junction box which eliminates the need for installing a separate fuse box with the heater; this provides double protection to both equipment and personnel.

The units are available in a wide

range of sizes with several "special design features" possible.

#### Rust Preventive

*Enthone, Inc., Dept. MF, 442 Elm St., New Haven, Conn.*

The above manufacturer has announced a new product designated as Enthone Compound NR-31 to prevent rusting of steel, cast iron and other iron alloys during storage. The product is a mildly alkaline, water-soluble material used in a concentration of 1 oz./gal. It leaves almost no visible film on the steel. Tests have indicated that it will protect iron and steel against rusting in 100% humidity for several weeks or more. The product is readily removed by washing with water. It contains surface active materials to facilitate rapid drying of water and to provide for uniform distribution of the anti-rust compound over the surface of the object.

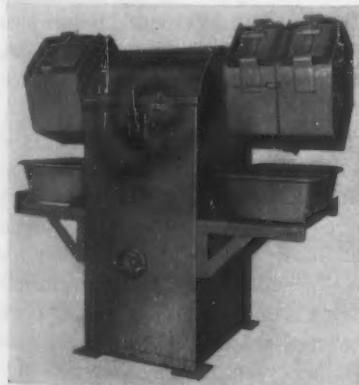
The compound is recommended for prevention of rusting following cleaning, pickling, descaling, burnishing and tumbling.

Compound NR-31 is available in 100 and 300 lb. fiber packed drums as a free-flowing powder.

Technical bulletin and free sample may be obtained by writing to the company.

#### Multiple Burring Barrel

*Rampe Manufacturing Co., Dept. MF, 3320 St. Clair Ave., Cleveland 14, O.*



To assist those finishers who have many small lots of parts to deburr, a multiple burring barrel which permits two lots of parts to be handled at the same time in place of one has recently been developed.

If two of these multiple units are used on the Rampe Twin Finisher a total of four individual lots can be

*The right combination counts*



**SIMONDS  
ABRASIVE CO.**

**Abrasive Grain**



Simonds Borolon grain has the right combination to put you in the 'chips' . . . the quality controlled combination of size, shape and cutting action for efficient polishing . . . the sure combination for speed, economy, and satisfaction on all your jobs. Complete line includes every variation from coarse to fine grain. Free bulletin ESA 198 lists uses and tells how to use Borolon grain on set-up wheels.

*Write for it and name of  
your Simonds distributor.*

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON

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.... BY EXPERTS



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Lining  
Department

**LOWER INITIAL COST.** Our complete fabrication and assembly facilities assures you of a complete job built in one plant under expert supervision.

**LONGER SERVICE LIFE.** Our corrosion engineers have no soft spot for any particular lining material and will recommend the best proven lining for your particular requirements.

**REDUCED DOWN-TIME.** You are assured expert workmanship by our many years experience in building acid-proof tanks.



Koroseal® Lined Chrome Tank  
Complete with Exhaust Hood,  
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Units • Lined Drums • Lead Fabrication • Acid-Proof Maintenance Materials



\*Product of B. F. Goodrich Co.

\*Trademark

processed at one time—these multiple units being interchangeable with the single hexagonal barrels which are standard on that machine.

Furthermore the same multiple unit can be used on the single barrel machine, thus doubling the number of lots that can be tumbled on that machine. Multiple units can be furnished unlined or lined with vinyl plastic, as desired.

### Improved Rectifier

*Hanson - Van Winkle - Munning Co.,  
Dept. MF, Matawan, N. J.*



An improved selenium rectifier has been developed for the electroplating industry, selling at a popular price and having a combination of features that have never before been offered in a single commercial rectifier used in electroplating operations.

The H-VW-M rectifier delivers a full wave, six-phase current with a theoretical ripple of 4.5%. AC input is dual—220/440 volt, three phase, 60 cycle. The manufacturer guarantees continuous operation at full capacity 24 hours a day, for a full year.

The rectifier comes in both self contained and remote control models. The self-contained model houses all the equipment and electrical devices that make up the complete rectifier unit—selenium stacks, transformers, cooling fan, magnetic devices, protective mechanisms, starter, meters and voltage control mechanisms. Size of the 12/24-volt (1,500/750 amps.), self contained unit is 24-in. wide, 26-in. deep and 65-in. high.

The remote control model is built in two units. One unit contains the controls; it houses the starter, meter and voltage control mechanism. The other unit houses the other rectifier equipment. The control unit, which may be located anywhere in the plant,

handles as many basic rectifier units as are needed in any single electroplating operation.

Chief design features:

1. A 12-14 gauge steel cabinet that houses the electrical equipment. The all-welded cabinet, which is designed for heavy-duty service, is built on substantial iron frames, and mounted on rubber shocks.

2. General Electric or Westinghouse fan. This fan, which draws air through the cabinet to cool the transformers and selenium stacks, is run by a totally inclosed motor that has sealed lubrication.

3. Glass wool dust blocks. These treated blocks filter incoming air, remove all solids and a large portion of fumes.

4. Control and power transformers that are calculated on the basis of convection cooling. These transformers, which step down the voltage of the AC current going into the selenium stacks, continually operate at temperatures up to 25 deg. C. above ambient.

5. A single-knob control switch. This type of switch, which is used on all intermediate ratings, prevents unbalancing of phases. The switch, which has 22 positions, covers the entire voltage range, or any part of it.

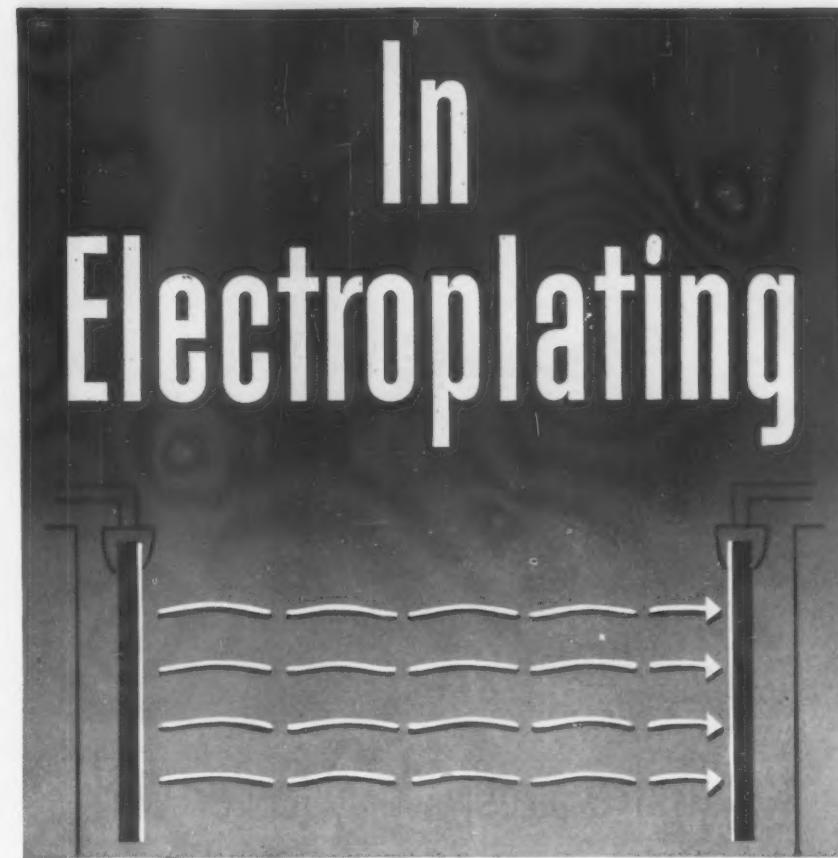
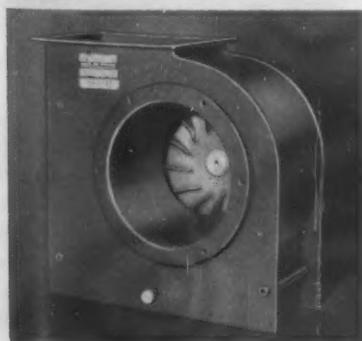
6. Standard-make motor starter—rather than a starting contactor. The motor starter will provide overload protection on the AC side, as well as low-voltage release.

7. Heavily coated selenium stacks. These stacks, which rectify low-voltage AC current to low-voltage DC current, are dipped for corrosion resistance and fungus proofing.

**Corrosion Resistant Exhaust Ventilators**

*American Agile Corp., Dept. MF,  
P.O. Box 168, Bedford, O.*

Corrosion resistant exhaust ventilators for use in industrial plants and laboratories are now produced by the



## **...you'll want Koppers Potassium Cyanide Solution**

● Koppers offers Potassium Cyanide in easy-to-handle liquid form. This time- and work-saving solution combines with copper cyanide, zinc cyanide, cadmium and silver cyanides to form a complex salt that is soluble in water.

Solid granules of Potassium Cyanide presently being used in the electroplating process require a dissolving period which, in turn, involves extra time and effort, and results in higher expenditures. Koppers economical, ready-to-use solution requires no preparation, whatsoever.

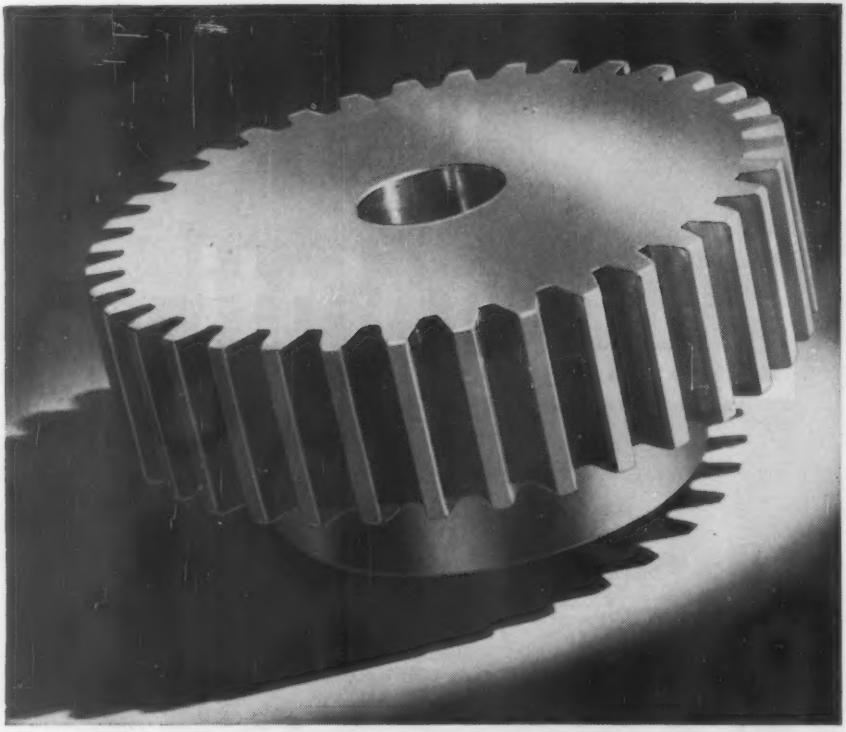
Potassium Cyanide is widely used in the copper plating of automobile parts, such as bumpers, door handles, and grilles, where copper is used as a base coat for chromium plating.

Koppers Potassium Cyanide is available in 55-gallon drums. Its lower price structure and its easy-to-use liquid form make it especially desirable. For further information, write:



### **Koppers Chemicals**

**KOPPERS COMPANY, INC.**  
Chemical Division, Dept. MF-63  
Pittsburgh 19, Pa.



## High lustre finish... faster with **SUPER-HONITE CHIPS!**



**YES!** New Super Honite gives a better finish—faster—than any other barrel finishing abrasive. That's because it's the world's *toughest* abrasive chip—engineered for grinding and burnishing to a high luster finish. Does it in jig time, too, because chips don't crumble or pulverize to slow the job.

So remember, for a better finish—in record time—specify Super Honite. No other chip cuts faster—no other chip cuts as long!

**TOUGHEST NATURAL CHIP!** Use Regular Honite for close tolerance work or minimum removal of metal. No other barrel finishing abrasive—not even granite—retains its edge as long as Regular Honite.

WRITE TODAY for your free copy of "3M Barrel Finishing" . . . it's filled with helpful information for increased efficiency, lower costs. Address Minnesota Mining & Mfg. Co., Dept. MF63, St. Paul 6, Minnesota

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Company.....

Address.....

City..... Zone..... State.....



Made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.



above company. These exhaust ventilators are fabricated throughout from Agilide (unplasticized polyvinyl chloride) which offers high structural strength and outstanding chemical resistance to most corrosive vapors encountered in industrial operations, including nitrous gases. The exhaust ventilators are of fully welded construction, and are available in four different sizes, ranging in capacity from 250 to 1,670 c.f.m.

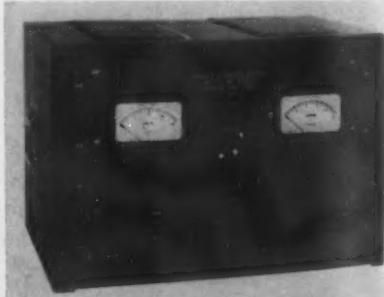
They are furnished with motor, completely mounted on a steel ventilator and motor base, and can easily be incorporated into already existing or new exhaust and ventilating systems.

The material is not subject to aging or stress corrosion, and extensive tests of these exhaust ventilators for several years prior to their present release assure extremely long operating life.

### Rectifier Power Supply

Perkin Power & Electronics Engineering Corporation, Dept. MF, 345 Kansas St., El Segundo, Calif.

A new magnetic amplifier regulated power supply, designated as Model No. MR532-15, has been developed by the above company. This power supply is rated at 5 to 32 volts D.C. and 15 amperes continuously and features no tubes. In addition to a regulation accuracy of  $\pm 1\%$  for D.C. load variations from no load to full load the unit is also stabilized for A.C. line variations from 105-125 volts A.C. The ripple of this unit is 1% maximum. The unit is also provided with a 4½" ammeter and voltmeter and its maximum overall dimensions are 22" wide x 17" deep x 14½" high.



It is finished in grey wrinkle and its approximate weight is 125 pounds.

The unit is mounted in a bench-type cabinet which can also flexibly be utilized for 19" rack panel mounting. An additional feature to this Power Supply is that in addition to the regular A.C. on-off switch it is also provided with a magnetic type circuit breaker on the D.C. side with a time delay provision.

### Kit of pH Papers

Fisher Scientific Co., Dept. MF, 717 Forbes St., Pittsburgh 19, Pa.

From the laboratories of Fisher Scientific's Chemical Division comes a kit of six "short-range" indicating papers that divide the entire pH scale



of 0 to 14 into distinctive colors for each half unit — and permit estimations to one-fourth unit or closer.

The user merely moistens a strip of the appropriate paper; matches while wet with the color key printed on a plastic dispenser.

A complete Alkacid pH Test Kit is available in a convenient wooden case; it contains one long-range Alkacid Tester in a patented vapor-resistant plastic dispenser and a dispenser of each short-range paper as well. Price: about \$13.

### Plating Barrels for High Temperatures

Daniels Plating Barrel & Supply Co., Dept. MF, 129 Oliver St., Newark 5, N. J.

To meet the industry's demands for plating barrel cylinders that will stand up to the increasingly-popular high-speed solutions operating at high temperatures. The manufacturer has developed a new line of cylinders fabricated of DuPont high-temperature Lucite, of Fiberglas (Pla-Tank) and of plastisol-covered steel.

These new materials supplement the very successful and durable standard Daniels line that includes Bakelite cylinders which are ideally suited for less corrosive solutions, such as the conventional nickel, operating at room temperatures, and the rubber-covered Bakelite and hard rubber cylinders for higher speed, and higher temperature operation.

Another addition to the Daniels line is the new octagonal cylinder that is interchangeable with the round while

## Behind the 8 Ball with your Anodes?

HERE ARE TWO  
PRACTICAL SUGGESTIONS  
DESIGNED TO HELP YOU!

### 1 CONVERSION OF SCRAP NICKEL TO NEW ANODES

New Jersey Metals can help you stretch your present nickel supply by melting and recasting your grade "A" nickel scrap, anode ends and stubs into new nickel anodes. Complete anode conversion—including cutting and finishing—is completed in a matter of days. What's more you actually save 5 to 10 cents per pound over the purchase of new anodes. The purity content of the new anodes returned to you is guaranteed. Quotations on any quantities—laboratory analysis is free.

### 2 ZINC BALL ANODES

Here's the newest addition to the New Jersey Metals line. Manufactured of the highest grade zinc, New Jersey Metals zinc ball anodes are guaranteed to be 99.99% pure virgin zinc. Designed in the most efficient shape, these anodes provide the greatest plating surface per pound of any anode. Easier to handle, they facilitate faster production and can be used with either ball holder or anode basket.

Furthermore, you're buying all metal—no dross as hidden losses or blow holes to carry contaminating matter to your plating solution.

Whether it's converted nickel anodes or pure zinc ball anodes, it will pay you to look to New Jersey Metals for your anode requirements. Call Elizabeth 2-6465 or write . . .

## New Jersey Metals Co.

Serving industry from coast to coast since 1921

714 ROCKEFELLER ST., ELIZABETH 2, N. J. { N.J. METALS



That's our NARACO "Staff" telling you to COME AND GET the FINEST SERVICE available in the field of custom built racks and fixtures. If you've been "Hungry" for the sight of a perfectly plated part, if you've longed for smooth production and repeated success in plating then answer NARACO'S call and COME AND GET IT!

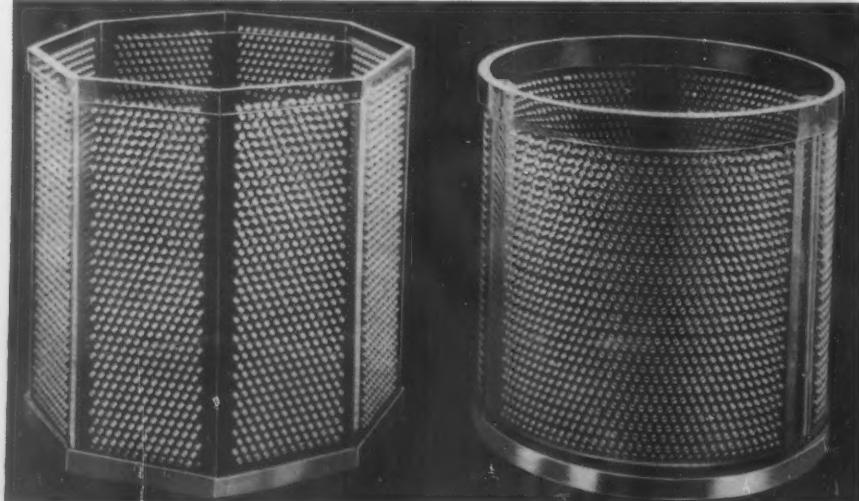
## NARACO

AMERICAN RACK CO.  
4632 West 71 Place, CICERO, ILL.

NATIONAL RACK CO. INC.  
1781 Madison Street, PATERSON, N. J.  
Plant No. 2, 386 River Street, PATERSON, N. J.

IMPERIAL PLATING RACK CO. INC.  
1613 Industrial Avenue, FLINT, MICH.

INDUSTRIAL RACK CO.  
3462 San Fernando Road, LOS ANGELES, CALIF.  
Plant No. 2, 1000 East Ten Mile Rd., HAZEL PARK, MICH.



allowing approximately 10% greater load capacity. The octagonal cylinders add a slight agitation to the plating

load thereby reducing plating time and insuring more uniformity.

All the cylinders can be supplied

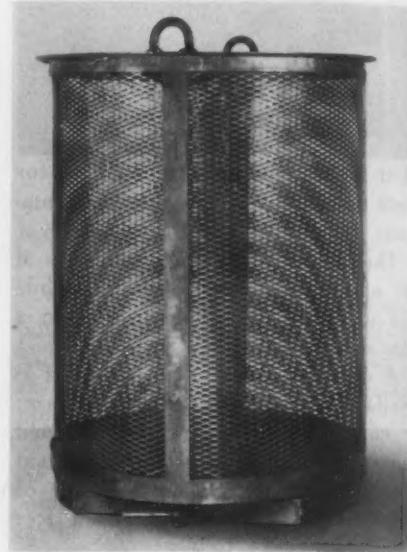
with either perforations or slots, and each type of cylinder has been designed to meet a modern plating need.

### Expanded Metal Degreasing Baskets

*Wheeling Corrugating Co., Dept. MF, Wheeling, W. Va.*

This degreasing basket utilizes expanded metal to provide maximum open area and penetration of liquid or air, combined with superior strength and durability.

According to the manufacturer, the smooth diamond pattern of the expanded metal prevents lodging of



liquid and waste particles in corners, with consequent reduction in size of openings—as sometimes happens with other materials used in basket construction.

The company makes baskets and trays of expanded metal in a variety of other sizes and shapes to suit special industry needs.

Made by slitting and stretching solid steel sheet, of various gauges, into one-piece panels that can be easily formed and welded to steel framework, Wheeling expanded metal has a high strength/weight ratio that is a distinct advantage in many such industrial applications.

### Protective Wrap for Metal Parts

*Sherman Paper Products Corp., Dept. MF, 1580 Oak St., Newton Upper Falls 64, Mass.*

Spot-Seal a new protective wrap for wrapping metal parts, has just been announced by the above company. This is a specially coated wrap that sticks only to itself. Simply wrap it

over the parts, press it together and the package is sealed.

It makes a tight, dust-proof, water-repellent, tamper-proof wrap that keeps out dirt and foreign matter, and protects finely-finished metal surfaces from scratches, abrasion and fingerprints. It is the ideal wrap for small sub-assemblies, replacement kits or other small units. The loose parts can be wrapped together—easy to store and ship, with no loss or damage to small parts.

It is adaptable to either manual or mechanical production packaging, and is available in rolls, printed or plain, 600 lineal feet long and in usual widths



from 12 to 48 inches. Information may be obtained by writing the company.

#### First Aid Burn Kits

*Davis Emergency Equipment Co., Inc., Safety Division, Dept. MF, 45 Halleck St., Newark, N. J.*

Davis First Aid Burn Kits now include an Aerosol automatic spray dispenser containing Americaine, the miracle pain-killing burn treatment. The company has also introduced a smaller kit with complete equipment for instant first aid treatment for burns.

In addition to the spray dispenser, the standard large kit contains Americaine in the form of a greaseless, water soluble ointment. In both forms this is antiseptic, greaseless, excludes air, and kills pain almost instantly because of its principal active ingredient—20% dissolved benzocaine, widely used in medicine and dentistry as a rapid local anesthetic. The kits also contain an assortment of bandages and compresses.

Carrying cases are of heavy gauge

# CrO<sub>3</sub>

Chromic Acid

for

- DECORATIVE PLATING
- HARD CHROMIUM PLATE
- ANODIZING ALUMINUM
- CHEMICAL CONVERSION COATINGS
- STRIPPING COPPER
- METAL CLEANING BATHS
- ORGANIC SYNTHESIS
- MANUFACTURE OF CATALYSTS

• The Mutual name and trade mark on a Chromic Acid drum guarantee a product with a minimum assay of 99.75% and a sulfate content not exceeding 0.1%. Chromic Acid of that purity may be used with confidence in any of the above applications.



**MUTUAL CHEMICAL CO.  
OF AMERICA**  
270 Madison Avenue      New York 16, N. Y.

steel, with baked-on enamel, and retractable hangers for wall mounting. The large kit (Model 492) is priced at \$29.88; and the small kit (Model 495) at \$10.85.



#### Automaite Washer Units

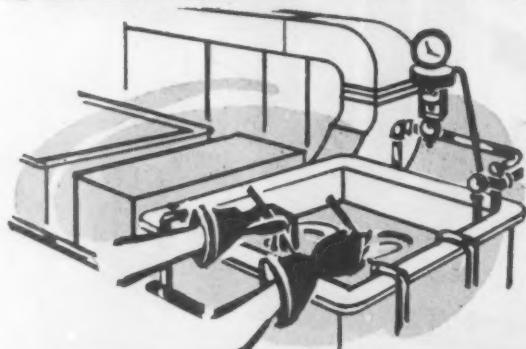
*Ipsen Industries, Inc., Dept. MF,  
715 S. Main St., Rockford, Ill.*

A new line of compact, forced-cir-



# No Guesswork Here . . . It comes out right

## RICHARDSON-ALLEN SELENIUM RECTIFIER



When "it comes out right" consistently, you know the satisfying result — greater output, highest quality, fewer rejects, lower labor costs.

This profitable achievement depends not only on your own skill and ability. It also requires and deserves the most dependable rectifying equipment.

You can assure the dependability of your d c supply by installing Richardson-Allen Selenium Rectifiers which have established records in hundreds of plants for long, trouble-free service.

The Richardson-Allen line includes various types and the widest selection of voltages and currents. For example, all models may be standard or plus rated; there is a choice of basic and remote controls; self-contained; heat exchanger; sequence programming controls; anodizing, and also suitable equipment for manodizing.

There is an R-A factory representative in most major cities. If you do not find him in your phone book, write directly to us.

### RICHARDSON-ALLEN CORPORATION

a manufacturing affiliate of  
WESLEY BLOCK AND COMPANY, 39-15 MAIN ST., FLUSHING, N.Y.  
IN CANADA: Richardson-Allen of Canada, Ltd., 370 Victoria St., Toronto, Ont.

**SET IT and FORGET IT**

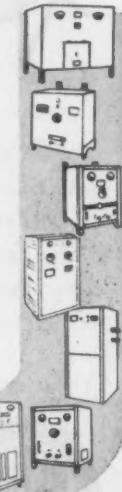
culation washers in three different sizes, designed to speed metal cleaning through automatic cycling and by combining washing and rinsing in a single operation, is announced. The single-stage units completely eliminate secondary washing and extra work handling operations by employing an automatic surface spray skim-off. When used with recommended detergent and surfactant compounds, metallurgically clean results are accomplished over 50% faster than with ordinary washing methods. For average load conditions, a total cycle of five to seven minutes is sufficient to thoroughly clean workpieces.

Solution temperatures, work handling, and cycles for solution circulation and skim-off are all controlled automatically by pre-settings on a

panel conveniently located on the front of the washer.

The compact, welded steel units are available in load capacities of 300, 400, and 700 lbs. Load platforms are swivel-type roller units, and can be attached to either end of the washer for in-and-out operation, or to both ends for straight-through operation. Platforms have solid pans to catch drippings.

Solution heating is provided by immersion-type elements, available for gas, electric, or steam heating. Temperatures can be varied to fit requirements of load and condition of workpieces for greatest washing efficiency. Circulation and solution skim-off cycles are also controlled automatically by timer settings on the control panel, and are varied to fit individual load re-



quirements. Setting the circulation timer initiates the complete cycle.

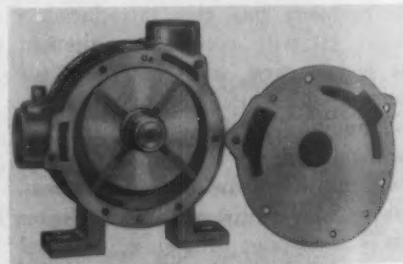
The load rack is held, immersed, and raised automatically by an air-hydraulic cylinder. As the load lowers into the solution tank, a motor-driven propeller automatically begins rapid circulation of the heated solution past curving baffles and downward through the work. The downward circulation prevents any displacement of small parts in the work basket.

When the pre-set power-washing cycle ends, a surface spray skim-off is started on the surface of the solution and moves oil and other impurities into an overflow ledge. The overflow drain is closed during the washing cycle, but opens automatically as the skim-off cycle starts. The oil-free surface assures clean work as the rack is raised, without the necessity of a separate rinsing operation. The skim-off spray accomplishes the surface cleaning within one to two minutes.

When the skim-off spray has cleaned the surface, the load automatically raises to the load-unload position above the solution for draining and drying. Solution loss is held to a minimum because excess solution is drained directly into the tank below. To speed drying, a spring-loaded plate on the bottom of the rack seals off the load from the humidity and fumes of the solution. In gas heated units, exhaust from the burners passes through the upper chamber to further facilitate load drying. The plate keeps the solution under seal during loading or when unit is not in use to reduce evaporation and help maintain solution temperature uniformity.

### **Oil-Less Pressure & Vacuum Pump**

*Leiman Bros., Inc., Dept. MF, 102 Christie St., Newark 5, N.J.*



A new design of oil-less pressure and vacuum pumps, which end all contamination dangers because they run absolutely dry, has been placed on the market by the above manufacturer.

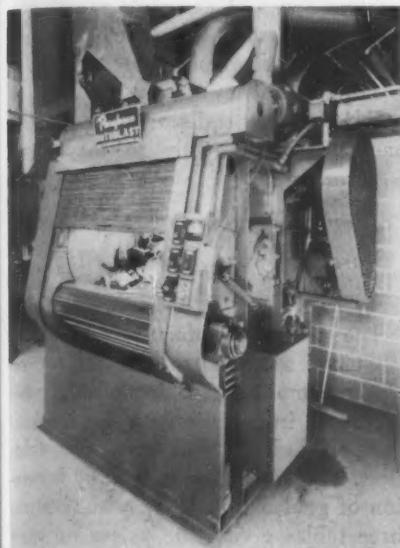
The pumps are ideal for food handling equipment, paper manufacturing,

textiles, graphic arts and any other application where possible oil contamination is a problem.

Equipped with lifetime-sealed bearings, the pumps require no lubrication whatever. Their range is up to 11.5 c.f.m., 23 inches vacuum and 21 p.s.i. pressure. Pump speeds are up to 1,750 r.p.m.

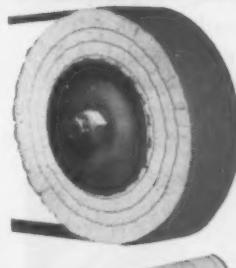
#### Two New Sizes Added to Airless Blasting Line

Pangborn Corp., Dept. MF, Hagerstown, Md.



The two new Blastmaster barrel sizes (3GN and 18GN) will include all of the eight exclusive construction features of the presently available sizes. One of the most important of these features is the door, of all metal construction laminated with a rubber back to protect it from flying abrasive. Its side edges have rollers which travel in a mechanical labyrinth. The door moves up and down like a window curtain, easily operated by a crank which winds or unwinds the roller. It is held in any position by a ratchet and brake on the roller. Another feature is a heavy rubber curtain located between the door and the area in which the blasting takes place. This curtain protects the door from flying abrasive and prevents castings from damaging the door. One end of the curtain is attached to the door and the other end to the roof deck. The curtain rolls up and down with the door, weighted by a free metal roller which holds it in position while blasting is taking place. The work conveyor drive on the new barrel has been provided with automatic torque throw-out arm protection to eliminate the possibility of damage to the equipment in case of

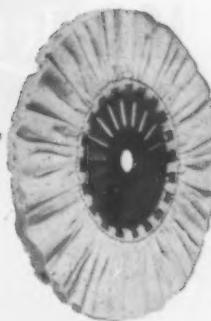
## A FEW OF THE MANY **FORMAX** PRODUCTS



### STYLE C-20 CONTACT WHEELS

and F-26 Belt Lubricant

A C-20 flexible Contact Wheel will form itself to the shape of the work and permit the abrasive felt to polish contoured surfaces and F-26 Abrasive Belt Lubricant will increase belt life by preventing loading and glazing. Produces finer, smoother and brighter surfaces through lubrication.



### ZIPPO BUFFS

These famous long-wearing buffs run cool under all buffing conditions. Constructed of high count bias-cut cloth or sisal mounted on safe steel centers. Available in a wide range of densities and center diameters.



A complete line of buffing compounds in bar form as well as in liquid form for brush or spray application. Also Flex-A-Giu polishing wheel cements.

Our Laboratory and Sales Engineering staff would welcome the opportunity to be of help in solving your finishing problems.

Send for descriptive literature

# FORMAX MFG. CORP. DETROIT 7, MICHIGAN

"THE FOUR McALEERS"

MANUFACTURED IN CANADA BY JOHN GALLOWAY LTD., KITCHENER, ONT.

jamming. Power for the work conveyor drive is supplied from a separate motor through V-belts to a spur type reducer mounted directly on the work conveyor top shaft—much more efficient than the usual worm arrangement. Anti-friction roller bearings have been applied in the barrel at all points where shafts must carry loads.

Another important feature of the Blastmaster Barrel is the non-pinch work conveyor which consists of a continuous hardened steel roller chain with heavy metal slats. The slats are designed so that at no time is any opening presented to pinch the work or clog. Individual perforated slats are easily replaced as they wear, and the entire assembly can be easily removed from the machine. Drum ends are free turning on large-size Timken roller

bearings packed with grease and perfectly sealed. The conveyor take-up is located at the bottom of the work conveyor. Unobstructed bolt-head screw provides ready access for wrench, makes take-up operation easy and quick. Controls for the barrel are centralized in location so that unnecessary steps and lost motion are reduced to a minimum.

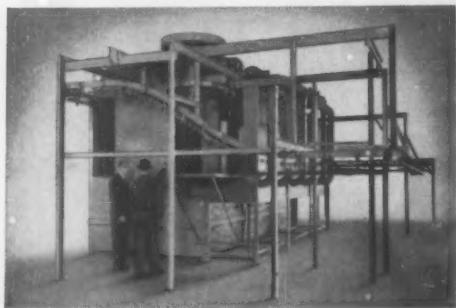
During barrel operation, the cleaning and reclaiming system is constantly at work removing all sand and debris and maintaining the full efficiency of the abrasive.

A quick-acting work loader, with double cables for safety, positively delivers the entire load into the machine. The work goes into the machine with the least possible drop, reducing casting breakage, but the discharge

# NO JOB Too Small or Too Large

Alvey-Ferguson has, for many years, provided Washing Machines to fit the varying needs of all types of metal working and other plants. These years of experience back the engineering of each specialized washer built to meet your plant's special requirements.

The A-F Washer shown at right is being used by a large manufacturer to wash gummy lubricants from stampings, which must be thoroughly cleaned before assembly. Write for folder — today!



## THE ALVEY-FERGUSON COMPANY

203 Disney Street

Established 1901

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### CONVEYING EQUIPMENT



# Alvey-Ferguson

WASHING MACHINES FOR INDUSTRY

angle is such that even flat pieces of work will not hang up on the loader or require the operator's attention.

The 3GN barrel (3 cu. ft.) is powered by two  $\frac{1}{2}$  hp. and one  $1\frac{1}{2}$  hp. motors. The 18GN (18 cu. ft.) uses two  $1\frac{1}{2}$  hp. and one 15 hp. motors.

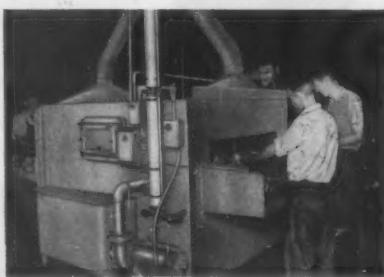
### Monochromatic Colorimeter

Bausch & Lomb Optical Co., Dept. MF, 635 St. Paul St., Rochester, N. Y.

A new model monochromatic colorimeter for determining color densities and percentage of light transmission in quantitative analyses has been announced.

The instrument employs transmission-type interference filters which provide high spectral purity, insuring the detection of small absorption bands

**None Too Small** — For washing metal products of various shapes and small metal parts this "Standard" Model A-F Washing Machine has been designed. It washes thoroughly, economically and efficiently.



**None Too Large** — Twenty-seven tons of water are required to fill this huge A-F Cleaning and Drying Machine to operating level. Incorporated in this 14-foot giant are many special design features. A-F Engineers are specialists in all types of "custom-built" equipment.

Write for folder — today!

in the transmission curve. Because the filters utilize metallic films evaporated on glass surfaces, they will not deteriorate with age.

Even with this feature, previously available only on more expensive and complex instruments, the new colorimeter is simple to operate. Two convenient knobs give complete control. A dual-purpose filter holder accommodates either 2" x 2" or 1" x 1" filters. When the holder is withdrawn from the light path, the light is automatically cut off from the photoelectric cell, thereby avoiding damage to this sensitive element.

The scale gives direct transmission and density readings by means of a floating spotlight. Precalibrations have been selected to cover the more commonly employed clinical procedures.

## Manufacturers' Literature

### Industrial Apparel

Worklon, Inc., Dept. MF, 253 West 28th St., New York 1, N. Y.

This latest Worklon catalog of industrial apparel is devoted to garments made of Du Pont Orlon. It tells how work clothes made of this "miracle" fabric cut costs under severe chemical, acid or other corrosive conditions. Various types of garments are shown, including details of each, sizes and prices, and a sample swatch of Orlon is also included.

For further details or copies of this booklet write directly to the manufacturer.

### Folder on Precious Metal Plating

Auromet Corp., Dept. MF, 267 Elizabeth St., New York 12, N. Y.

The above manufacturers of precious metal salts and solutions, have recently compiled a folder which gives operating information on gold, platinum, palladium and rhodium solutions. It also discusses the alloy formation of gold baths. Along with this are three tables giving the prices of various solutions and salts.

A general discussion on the preparation of work for plating and making up the baths is given.

### Rheostat Bulletin

Hanson - Van Winkle - Munning Co., Dept. MF, Matawan, N. J.

A new bulletin, offered by the manufacturer describes and illustrates the new H-VW-M tank rheostats.

The bulletin, TRA-527, lists standard ratings and sizes of these rheostats, which are used to adjust current density in plating tanks. It describes the rheostat mountings, the simplified switching systems and the short-circuit switch required for striking chromium or nickel on die castings. The design features that practically eliminate all switch failures by excessive heating are also described.

Photographs and drawings show front, rear and side views of the rheostat. A schematic drawing shows a typical rheostat-to-tank hookup. The bulletin also gives suggestions for selecting and ordering a tank rheostat to protect it from overloads due to changes in work area, solution temperature or line voltage.

## Calrod Heating Catalog

General Electric Co., Dept. MF,  
Schenectady 5, N. Y.

A 1953 edition of General Electric's catalog on Calrod electric heaters and heating devices has been announced as available from the company.

Designated as GEC-1,005D, the 60-page, two-color information and buying guide describes the equipment in terms of application, special features, installation, and pricing.

Indexed by process and application, the catalog also contains methods of determining power requirements and heat losses by applications. These are explained by both graphs and formulas. Another feature of the publication is an index of General Electric application bulletins, and data and specification sheets available from the company.

A total of 175 photographs and drawings illustrate the various heater-types of products, including immersion, strip, cartridge, tubular, insertion, and fin heaters. Other devices described in G.E.'s "Red Book" of heating are melting pots, thermostats, switches, oven heaters, and induction heaters.

### Mono-Column Demineralizer

Penfield Manufacturing Co., Inc.,  
Dept. MF, 19 High School Ave., Meriden, Conn.

A new catalog sheet describes the above manufacturer's new M-100 Mono-Column Demineralizer. A photograph and schematic diagram on the front of the sheet, combined with the detailed description of parts, sample specifications and performance data on the reverse side, provide a quick, concise and complete resume of all essential information.

### Buffing Compounds

The Globe Compound Co., Dept. MF, Waterbury-Bristol Road, Waterbury 12, Conn.

A new technical bulletin, T-4, describing buffing compositions and their applications is freely available. The company calls particular attention to their No. 300 hand bar size and GY-63 automatic type yellow all-purpose water-dispersible buffing compositions. These compositions have a diversity of applications, including coloring of steel and cutting and coloring of aluminum, without requiring cleaning when lacquering is desired.

# Tops for Quality and the top tells why!

**Do we ever make a batch of Chromic Acid less than 99.7+-% pure? Every so often we do. But when that happens, right out on the dump it goes—and good riddance.**

**The top label says "Extra High Qual-**

**ity" and that's what every drum contains. We think you'll like the uniform quality of our product and the way we make good on our promises. When you're in the market, why not call us?**



### 99.7+ % Pure

Consistently low in chlorides, sulphate and insolubles. More than meets every requirement of the electroplating industry, as well as U. S. Government Specification AN-A-21 and Federal Spec. OC-303.

## BETTER FINISHES & COATINGS, INC.

268 Doremus Avenue, Newark 5, N. J. • 122 East 7th St., Los Angeles 14, Calif.

### Barrel Finishing Manual

Minnesota Mining and Manufacturing Co., Dept. MF, 900 Fauquier St., St. Paul, Minn.

A new 16-page manual on barrel finishing processes has been announced.

Use of the Honite barrel finishing method, a low pressure, random honing process for deburring and burnishing small metal parts, is discussed in detail in the illustrated booklet.

Included are sections on how to choose proper size barrel finishing chips for specific operations, and selection of the correct barrel finishing compounds for each.

Ten barrel finishing compounds are described, together with the purpose, characteristics, metals for which they

are recommended, and the prescribed mixture for each.

The booklet is available upon request from the manufacturer.

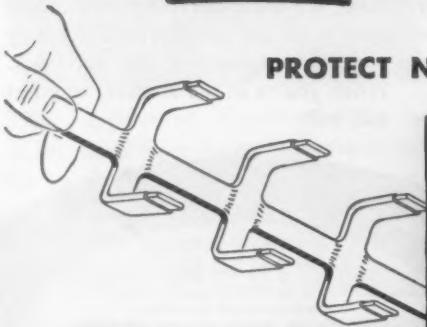
### High Corrosion Resistance Gives Nickel Plated Metals Wide Range of Uses

International Nickel Co., Inc., Dept. MF, 67 Wall St., New York 5, N. Y.

This 4-page reprint discusses how to prevent product contamination and minimize equipment maintenance by using nickel plating where economics do not justify use of solid alloy or clad metal. Successful applications in the chemical, food, petroleum and other process industries are cited which used deposits of 0.008 in. to 0.085 in. of nickel.

# How to cut costs still more with "218X"

**PROTECT NOT ONLY RACKS . . .**



COATING 218X is so tough, so long-lasting a coating that the more you use it, the more money-saving protection you get. Of course, you derive the biggest benefit from the outstanding application for Coating 218X — protection of racks.

This green plastisol stands up in all cleaning, plating, and anodizing solutions—even vapor degreasing cycles. It resists impact and abrasion without chipping, cutting or damage. In short—it means minimum rack coating costs.



You can do the same on this other equipment:

- Plating barrels • Drain boards
- Anode hooks • Tank screens
- Tote boxes • Dipping baskets

—all these and more can be protected longer, and with less maintenance expense, by means of the same Coating 218X you use for racks.

Make more use of your Coating 218X—you'll find many places where it can save you money, time and equipment. We'll be glad to tell you how to apply it.



**Products of UNITED CHROMIUM, INCORPORATED**

100 East 42nd St., New York 17, N.Y. • Detroit 20, Mich. • Waterbury 20, Conn. • Chicago 4, Ill.  
Los Angeles 13, Calif. • In Canada: United Chromium Limited, Toronto, Ont.

## Gas-Fired Oven Control

*Hauck Mfg. Co., Dept. MF, 124-136 Tenth St., Brooklyn 15, N.Y.*

This new 12-page Catalog No. 805A will be of interest to users of gas-fired industrial furnaces, ovens, kilns, driers, etc.

It describes the simultaneous controlling and accurate proportioning of air and gas with a single control valve for manual or automatic operation. A consistent air-gas ratio is maintained over the entire range of the mixer capacity.

The self-locking feature of the mixer control adjustment eliminates changing of mixture caused by hand locking adjustments.

Mixer capacity tables are given for

5 different kinds of gases and for 8 air pressure ratings.

The catalog will be sent on request.

## Organic Chemicals Catalog

*Antara Chemicals Division, General Dyestuff Corp., Dept. MF, 435 Hudson St., New York 14, N.Y.*

A new 28-page catalogue has been issued by the above company, covering such product groups as detergents, wetting agents, emulsifiers, brighteners, sequestrants, and dyeing assistants.

The book lists important application suggestions in a wide range of industries and introduces a new and simplified nomenclature system for Antara's entire line of products.

## Wet Process Tumbling Barrels

*Tumb-L-Matic, Inc., Dept. MF, 4510 Bullard Ave., New York 70, N.Y.*

A new bulletin, XL-52, offered by the above company, pictures and describes the Tumb-L-Matic "Wet Process" tumbling barrels—Type XL. These barrels are used for deburring, cutting down, smoothing and burnishing forged, stamped or cast metal parts by tumbling the parts in water with abrasive materials.

The bulletin describes drive mechanisms, electric controls and details of barrel construction. It includes specifications on six standard units now available.

## Air-Operated Control Bulletin

*The Bristol Company, Dept. MF, Waterbury 20, Conn.*

Free-vane air-operated controllers are described in a new 32-page bulletin, No. A120, published by the above company. Instruments for automatic control of pressure, temperature, liquid level, flow, humidity, pH, and electrical variables are described. Among the new products described are time-program controllers and electronic Dynamaster potentiometers and bridge instruments in air-operated control models. The fully-illustrated bulletin gives complete data on on-off, proportional, reset, derivative, reset plus derivative, and autoset types of controllers.

Bristol has also published a series of short bulletins giving complete specifications and other data on diaphragm control valves for use with air-operated controllers.

## Materials Handling Equipment

*Kornylak Engineering Corp., Dept. MF, 513-521 Communipaw Ave., Jersey City 4, N.J.*

A materials handling equipment reference chart describing their full line of materials handling equipment has been released by the company.

The chart is prepared in a handy to use form suitable for either wall mounting or folding to 8½ x 11 for easy filing.

For quick reference its 50 illustrations of materials handling equipment are classified into the categories of "Package Handling," "Bulk Handling," "Roller & Wheel Conveyor," "Monorail," "Storage Equipment," "Power and Hand Trucks," "Truck

Accessories," "Cranes and Hoists" and "Chain & Cable Conveyors."

Production men, purchasing agents, executives and engineers will find it extremely useful when considering materials handling problems.

This chart will be mailed free of charge to readers upon request.

#### Metal Hose Technical Data Book

Universal Metal Hose Co., Dept. MF,  
2133 South Kedzie Ave., Chicago 23,  
Ill.

Edited to satisfy both the engineers' and purchasing agents' want for information, on application, temperature ranges of various types of metal and wire braided hose, dimensions, couplings, assemblies, etc. Types described therein include seamless all-metal flexible pressure hose; interlocked suction, blower and conveyor hose; square-locked conduits and flexible spout tubing; high pressure hydraulic hose; double wire-braided hose for high pressure; single wire-braided hose for medium and low pressure; and others for special applications of vibration elimination, steam, gas stove connectors, etc.

#### Air-Operated Diaphragm Motor Valves

Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Dept. MF, Wayne and Windrim Aves., Philadelphia 44, Pa.

The Honeywell Series 100 Diaphragm Motor Valve is fully described and illustrated in a new Specification Sheet 419-2. The valve provides optimum narrow-band proportional control at a minimum cost. The Sheet 419-2 gives pertinent data such as size, construction, body pressure range, connections and complete mounting dimensions.

#### Aluminum Handbook

Kaiser Aluminum & Chemical Sales, Inc., Dept. MF, 1924 Broadway, Oakland 12, Calif.

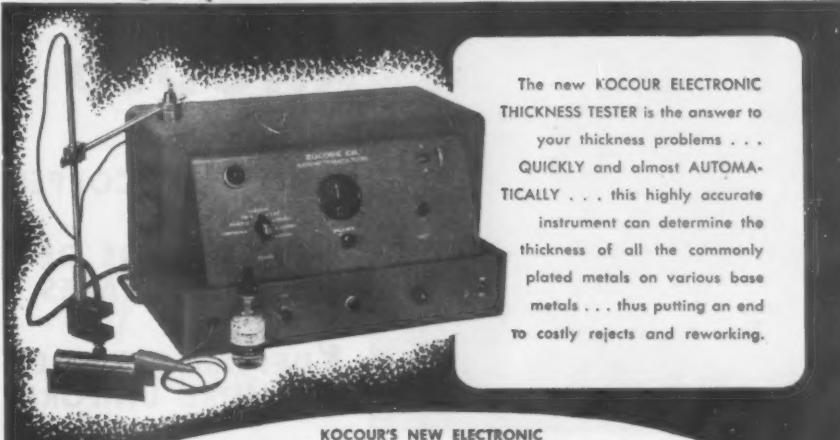
A 152-page informational handbook on aluminum sheet and plate has just been published by the above company.

The book includes discussions of the properties of aluminum, applications of sheet and plate alloys, fabrication and finishing methods as well as comprehensive tables covering availabilities, properties and other information of value to aluminum users. One feature is the allotment of separate

Question! How to Solve Your Thickness Problems?

Answer! With the New KOCOUR Electronic Thickness Tester!

DETERMINES THE THICKNESS OF METALLIC COATINGS BETTER! . . . FASTER! . . . EASIER! . . . CHEAPER!



The new KOCOUR ELECTRONIC THICKNESS TESTER is the answer to your thickness problems . . . QUICKLY and almost AUTOMATICALLY . . . this highly accurate instrument can determine the thickness of all the commonly plated metals on various base metals . . . thus putting an end to costly rejects and reworking.

#### KOCOUR'S NEW ELECTRONIC THICKNESS TESTER HAS THESE OUTSTANDING FEATURES:

- Set is self-contained.
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- Average test requires only about 1 minute.
- Minimum thickness determined is 500,000's of an inch (5,000,000 for chromium).
- Maximum thickness determined is indefinite.
- Operates virtually automatically.
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- Relatively insensitive to surface roughness.
- Compactly housed in portable metal cabinet, 17 $\frac{1}{2}$  x 10 $\frac{1}{2}$  x 10 $\frac{1}{2}$ .
- Operates from 105-125 volt, 60 cycle, A.C. electric outlet.

Write today for full information . . . no cost or obligation.

### KOCOUR Company

Dept. 22

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Specify KOCOUR TEST SETS from Your Supplier!  
Pioneers and Specialists in Testing  
Equipment Since 1924.

P.S. Whether your set-up calls for small or large volume work . . . there's a specialized KOCOUR SET for your requirements . . . developed to do a faster, better, more economical job.

pages to each standard alloy for ease of reference on mechanical properties and specific qualities. A section is also devoted to an outline of practices followed in producing aluminum sheet and plate.

#### Drip-Proof Motors

Lima Electric Motor Co., Dept. MF,  
Lima, O.

The above company has just completed a new brochure presenting their complete line of drip-proof induction motors. The brochure includes speed-torque curves, frame number charts, dimensions and specifications for motors from  $\frac{1}{3}$  to 150 horsepower, as well as complete descriptions of variations for optional mounting and

special purpose applications. This new bulletin also covers recent changes in design, including use of prelubricated sealed ball bearings throughout, which require no greasing or cleaning for normal life.

#### Brushes for All Purposes

The Torrington Brush Works, Dept. MF, Torrington, Conn.

A new colorful, completely illustrated catalog of over 400 brushes of all sizes and types used by industries, institutions and municipalities has just been issued. The catalog lists floor, bench, counter, paint, wheel, varnish, oil, chip, artists' flowing, glue, stencil, plasters', molders', sanitary, street and scrub brushes to name only a few.

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CINCINNATI.....	424 Commercial Square		

#### Bulletin on Anodes and Chemicals

Hanson - Van Winkle - Munning Co.,  
Dept. MF, Matawan, N. J.

A new 16-page, two-color bulletin, AC-107, offered by the company describes and illustrates a complete line of anodes, anode accessories, plating processes and plating chemicals.

Specifications and recommended applications are given for nine styles of anode bags, three types of diaphragms and 12 types of anodes. The bulletin describes 16 different H-VW-M plating processes. It describes the types of deposit and lists special equipment that the different baths will plate.

The bulletin also describes 30 salts commonly used in electroplating baths;

11 brighteners used in H-VW-M solutions; six kinds of purification materials; and the oxidizing liquid used in copper, bronze and silver plating. It also lists the standard packages that these products come in.

In addition, the bulletin tells how to test local thicknesses of electrodeposited cadmium, zinc, tin, copper and H-VW-M Albaloy. Four tables list the various times, temperatures and thicknesses of deposits made by the metals during test runs.

#### Plastic Pipe Bulletin

Anesite Co., Dept. MF, 3575 Touhy Ave., Chicago 45, Ill.

As a help to pipe users faced with

the problems of corrosion, the company has just issued a folder describing the company's plastic pipe known as Black Buty.

Included in this literature are specifications from  $\frac{1}{2}$ " to 6" diameters; estimated working pressures; data on chemical resistance; fittings available, and typical applications.

#### Blast Cleaning Hose Machines

Pangborn Corporation, Dept. MF, Hagerstown, Md.

The above manufacturer has issued Bulletin No. 100A describing the blast cleaning hose machines which are produced for industry's hand-operated cleaning jobs.

This new 28-page bulletin points out that, in spite of spectacular advances in automatic equipment and airless blast cleaning, there are many jobs which can only be accomplished by the use of hand-operated nozzle blast cleaning equipment. The two fundamental methods of applying the abrasive, direct pressure and suction, are described as well as the applications of both wet and soft abrasives. Tables are printed which show the relationship between orifice area and circumference in nozzle sizes and air flow with required hp. to develop air jets of varying diameters.

Selection of the proper type of blast cleaning hose machine is thoroughly discussed in the book. A useful table graphically shows how to match the nozzle size to the size of the abrasive being used.

Various blast cleaning accessories are pictured and described. Specifications are given for the various types of Pangborn abrasives available along with recommendations for their use.

#### Finishing Bulletin

Pelron Corporation, Dept. MF, 7740 West 47th St., Lyons, Ill.

The above firm announces the publication of a new brochure dealing with their services and products for the finishing industry. The new bulletin describes in detail the service which they offer manufacturers. This service includes special problem studies and recommendations regarding metal cleaning, phosphating, paint stripping, and paint booth operations. The new brochure explains how Pelron studies lead to the development of compounds to handle these problem jobs.

Also included in the bulletin are de-

tained descriptions of the company's line of standard products which have been specially developed to handle various specific metal finishing jobs and are available to manufacturers as such.

#### Rubber Lining of Tanks, Valves, Fittings, Etc.

Protective Coatings Div., Metal-weld, Inc., Dept. MF, Scotts Lane & Abbotsford Ave., Philadelphia 29, Pa.

An illustrated, two-color, 8-page bulletin describing the advantages and application of rubber lining to steel tanks, drums, pipes, valves, fittings and pumps has recently been published by the above firm. Included in the bulletin are important tables giving the resistance characteristics of MW rubber lining to inorganic acids, salts and alkalies, organic materials and a wide group of miscellaneous materials. Details on the chemical, abrasive and temperature resistant qualities of rubber linings and the different types of linings available are also given. Metal-weld's plant facilities for cementing, lining, and vulcanizing all types and sizes of equipment are illustrated, and the B. F. Goodrich Vulcalock Bonding Process, which joins rubber and steel together with a bond strength of over 500 p.s.i., is described.

#### Humidity Indicator

Andrew Technical Service, Dept. MF, 3805 North Clark St., Chicago, Ill.

The above firm announces an expanded variety of humidity indicating cards, under the tradename "Humigraph." The basic card contains seven indicator spots whose color changes from blue to lavender to pink under atmospheric humidity changes. The card is scaled to show relative humidity by reference to the color change spots.

Applications are wide-spread in process plant and laboratory work, where quick and simple indications of humidity are essential. Costing only a few cents each, the cards are also extensively used by equipment manufacturers, as well as producers of materials whose use must reckon with the humidity factor—for sales promotional purposes, utilizing cards of special designs, bearing special scalings and imprints.

Detailed literature and sample cards are available at no cost.

You'll save on  
silver plating  
costs...



...if you use anodes  
that have this stamp

It's the mark that assures you of top quality, profitable silver plating because 999 "Plus" Fine means silver anodes that are—  
(1) always up to highest standards in fineness—(2) always free from every trace of the impurities that cause plating troubles—  
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Bridgeport, Conn. • Chicago, Ill. • Los Angeles, Calif.  
Providence, R.I. • Toronto, Can.

#### Temperature and Conductivity Controllers

Leeds & Northrup Co., Dept. MF,  
4934 Stenton Ave., Philadelphia 44, Pa.

Complete data about moderate-priced electronic instruments for Two-Position or Proportional Control is now available in a new 20-page catalog, ND47, "Electromax Temperature and Conductivity Controllers," which has just been published by the company. This fully-illustrated publication shows how three types of temperature controllers are being used to regulate temperatures up to 1,000°F. It also describes a conductivity controller that is being used to check condensate purity.

The catalog also includes pictures of

typical installations. All specifications are listed in easy-to-read tables.

#### Buffing Compounds and Cleaners

Apley N. Austin Co., Dept. MF,  
Pequabuck, Conn.

The above manufacturers have published data on polishing, buffing and coloring compounds both of the water dispersible and the saponifiable type. The data given includes the code, description and use of the bars, as described from the standpoint of the compound. There is also a cross reference which gives the same data from the standpoint of the metal or alloy to be treated.

Alkali cleaners are also discussed in detail.

An important addition to this line

# FOR THE FINISH YOU LOVE TO SEE

**SPEEDIE** Buffing and Polishing Compositions are designed for all types of buffing—and coloring on all metals, plastics and wood. There's a **SPEEDIE** Compound for heavy cut, light buffing or coloring to a mirror finish. These compounds have been proved both in the laboratory and on the job to do the most meticulous buffing operation.

## CLEANING IS NO PROBLEM WITH:

**SPEEDIE** Tripoli—Stainless Steel—Chrome—Nickel Finish—Grease Stick or Emery Cake Compositions. We have the right material for the right job . . . Write us on your company letterhead about objects to be buffed, type of buff used, problem you may now be having and how many bars of **SPEEDIE** Compound you will require for an experimental run. All such requests are given immediate attention.

**WRITE TODAY**—You'll be gratified at the results with **SPEEDIE** Buffing Compounds.

*Photo by Underwood & Underwood*



**THE BUCKEYE PRODUCTS CO.**

7033 Vine Street Cincinnati 16, Ohio

Cable address: Buckprod

of buffing compound is described, the Solubar rouges, which aid materially the cleaning problem always prevalent when red rouge compounds are used.

## NEW BOOKS

### Applied Inorganic Analysis

*W. F. Hillebrand, G. E. Lundell, H. A. Bright and J. L. Hoffman. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 2nd Edition, 1953. Price: \$15.00. 987 pages plus index.*

The original volume, published in 1929 by the late Drs. Hillebrand and Lundell, has been brought up to date by Bright and Hoffman with the in-



**USE SPEEDIE  
BUFFING COMPOUNDS**

tested by one of the authors or by their associates so that the question as to reliability of any method described in the book should not arise, as has been the experience too often in the past.

### Oxidation of Metals and Alloys

*O. Kubaschewski and B. E. Hopkins. Published by Academic Press, Inc., 125 East 23rd St., New York 10, N. Y. 1953. Price: \$6.00. 218 pages plus index.*

Written from the point of view of the technical man who must understand the theoretical background of the subject of oxidation of metals and alloys at elevated temperatures in order to apply it to practical problems, this volume covers basic information, theory, experimental methods and results. Its interest will lie among the growing group of scientists in our industry who have taken seriously George Hogboom's emphasis on the importance of "What Lies Under The Plate." The index includes 550 references covering the present state of research together with a fairly comprehensive author and subject section.

### Sprayed Metal Coatings (gespritzte Metallüberzüge)

*Hans Reininger, Carl Hanser Verlag, Munich, Germany, 1952. Price \$14.80 DM. 246 pages, 151 figures and 25 tables.*

Metal spraying is generally used for protection against corrosion and scaling. In addition it is possible to manufacture articles from cheaper materials and spray on them expensive metals. Finally, worn machine parts may be brought to their original size by spraying metal deposits on them. The largest parts and machines may be coated by spraying because there is no limitation such as the capacity of plating vats, and the spraying apparatus is portable.

The success of metal spraying depends essentially on metallographic and manufacturing knowledge. The author describes the different processes and applications from his practical experience. The metallurgical fundamentals of metal spraying are also treated exhaustively, so this book throws authoritative light on the matter for both the shopman and the scientist.

Reviewed by  
*Dr. Richard Springer*

## Principles of Physical Metallurgy

Gilbert E. Doan. Published by McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. 3rd Edition. 1953. Price: \$5.50. 318 pages plus index.

This latest edition of a widely used text book will meet the requirements of those who are interested in the principles and theory of metallic behavior. Commercial aspects are given only brief treatment but the behavior of metals under the influence of the operations which are performed upon them during fabrication is presented in full detail. Basic principles are stressed over particular alloys and processes, since the book is not intended to deal with alloys of one type. New illustrations have been added to this edition and recent developments in testing methods and casting techniques have been included.

## N. Y. Industrial Directory

Greater New York Industrial Directory, Inc., Publishers. 401 Bway., Dept. B, New York 13. CANal 6-7679. Price: \$30.00 per copy. 772 pages.

1953 Imm. Delivery. Main section lists alphabetically by boro (N.Y.C.) over 10,000 mfrs., firm name, complete address, tel., corporate officers, pur. agents, sales mgrs., adv. mgrs., traffic mgrs., personnel mgrs., plant supts., No. employees, capital, products mfd., scope of bus., size of plant. Third Sect. lists mfrs. classified by product. First Sect. lists airlines, airports, comm. banks, trust companies, officers, hotels, insurance companies, railroads, steamship lines, trade routes, accommodations, comm. public warehouses, city offices, officials, laws, maps, charts, graphs, etc.

## News from California

By Fred A. Herr



As a result of conferences held in Los Angeles in Mid-May at which top executives from the firm's Wyandotte, Mich., head office were in attendance, plans have been completed for the construction by Wyandotte Chemical Corp. of a manufacturing plant in



**PURE WATER FOR PLATING  
AT A FRACTION OF FORMER COSTS**

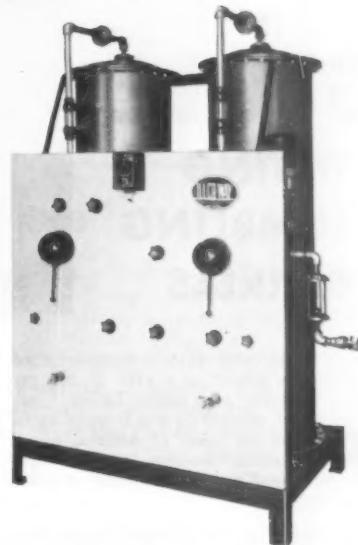


by **ionXchange**

Water that's solids-free  
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Records show that more and more fabricators and finishers are finding a short cut to a better product at lower costs by installing an ILLCO-WAY De-ionizer. . . . De-ionized water in rinsing or plating operations assures greater quality control and more operating economy. . . . Investigate also our new Chrome Purifier for recovery and purification of chromic acid anodizing or plating solutions. Write for literature.

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MODEL LU standard (Package-type) unit for production of solids-free De-ionized Water. Units completely assembled and tested in factory . . . shipped completely assembled, requiring minimum installation.



Los Angeles at a cost approximating \$6,000,000.

Out from the main office for the consultations were Robert Semple, president of Wyandotte, and Ford Ballantine, vice-president of the J. B. Ford Division.

A site has already been acquired in the southwestern section of Los Angeles, convenient to the harbor. The plans call for erection of a factory for production of cleaning compounds distributed to the west coast finishing trades, and detergents for the industrial, railroad and aircraft industries; also warehouse and administration facilities and a research laboratory.

The new plant will more than quadruple the floor area of Wyandotte's present Los Angeles distribution center at 114 West College Street, where the

firm's J. B. Ford Division has maintained facilities for a number of years. The new plant is expected to be completed by late spring of 1954.

Harold Kroesche, assistant branch manager at Los Angeles for Harshaw Chemical Co., returned in mid-May from a three weeks field service trip to Harshaw branches in San Francisco, Calif., Portland, Ore., and Seattle, Wash.

John L. Manning has resigned as sales engineer for Sundmark Supply Co., Los Angeles, to join the Promat Division of Poor & Co. of Waukegan, Ill., as technical representative in the Southern California, area.

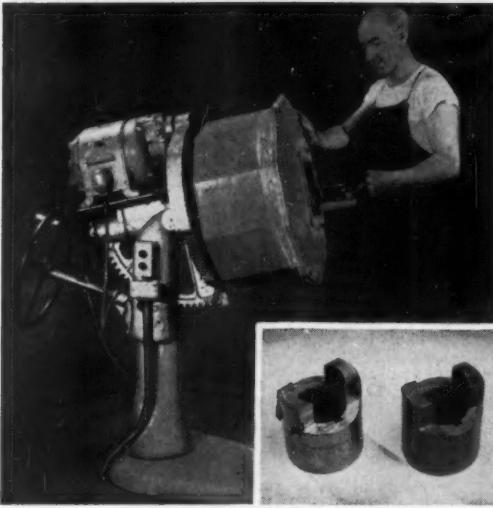
**DEBURRING  
PRODUCTION increased 85%**

## **AT BAKER- RAULANG**

**Leading Manufacturer  
Of Electric Lift Trucks**

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## **GLOBE TILTING TUMBLING BARRELS**



Insulating bushings were formerly deburred with emery wheels at a rate of 300 per hour. With use of a Globe Tilting Tumbling Barrel, production was stepped up to 2000 pieces per hour. In addition to an 85% production increase, the tumbling barrel released two men for work in other departments.

Extra economies are obtained by tumbling

odd shaped pieces difficult to deburr with hand wheels. With the Globe Tumbling Barrel, Baker-Raulang has doubled deburring production, and is obtaining finer finishes, using only 3 men in place of 5 men formerly required.

### **FREE EXPERIMENTAL SERVICE**

Let Globe's experimental engineering service analyze your finishing problems. Send samples of parts and completed piece to show finish desired and Globe will provide detailed finishing recommendations. Write today! No obligation, of course.



## **HUPP CORPORATION**

**GLOBE STAMPING DIVISION**  
**1230 WEST 76TH STREET • CLEVELAND 2, OHIO**  
**SERVING INDUSTRY SINCE 1912**

### **Perkin Engineering Moves into New Plant**

The Perkin Engineering Corp. has announced its move into a new 10,000 square foot plant at 345 Kansas St., El Segundo, Calif.

The plant is fully equipped with

modern machinery and facilities for the company's production of their standard and military lines of laboratory and airborne D.C. Power Supplies and associated electronic equipment.



*Reynolds Metals Co.* has announced the appointment of William P. Liljestrom as chemical specialist in its Pacific Coast District, with headquarters in Los Angeles. He was previously with the Filtrol Corporation at Los Angeles.

At the recent board meeting of the *Metal Finishing Association of Southern California, Inc.*, E. T. Brown of Cadmium-Nickel Plating Co., Los Angeles, was unanimously elected president for the 1953-54 term.

This is the third time Mr. Brown has been accorded that honor, having served as head of the plating shop owners group in 1950 and 1951. He has been active in local as well as national affairs of the association as a director of the National Association of Metal Finishers, and as a member of the Industry Advisory Committee, during which he conferred frequently with Government representatives in Washington on problems pertaining to the finishing industry.

Mr. Brown succeeded Walter Behlendorf, whose administration was distinguished by the establishment of a membership roster, preparation of a wage and hour survey and a credit setup.

Other new officers are: vice-president, Howard Woodward, California Rack Co., who several years ago also served as president of Los Angeles Branch, American Electro-Platers Society; and treasurer, C. Henry Klar, owner of Chromal Plating Co., Los Angeles. H. W. Smith continues as executive secretary, a post he has filled efficiently for several years.

Some sound advice on Union bargaining was presented at a recent M.F.A.S.C. meeting by Lewis T. Gardiner, Los Angeles attorney, who spoke on "What To Do When The Union Knocks At the Door." He proposed good personnel relations as a preventative for Union difficulties. Grievances, he said, can be anticipated and handled by shop managers or owners before a Union representative shows up, since many grievances are non-wage in character and involve more or less minor matters. The speaker emphasized that the shop owner, however, must keep his privilege to evaluate candidates for jobs, but cautioned the operators that when an employer sets up job requirements so as to deprive long term workers of a chance at a new opening, incentive decreases and production drops.

Inet, Inc., Los Angeles, producers of selenium rectifiers, announces expansion of its line of heavy duty power supplies to more adequately meet the demands of a wide range of industrial applications. The firm's standard units now range from 2.5 to 250 k.w.-d.c. output. The company also manufactures specially designed units for mining, marine, elevator and various industrial purposes. Crown Chemical & Engineering Company of Los Angeles serves as national distributor of Inet Rectifiers.

Kenneth W. Clayton, supervisor of sales and service at Los Angeles for Wyandotte Chemicals Corp., J. B. Ford Division, left for Wyandotte, Mich., recently to join Wyandotte technical engineers from other areas of the country in a ten day course of research and study at the home laboratory. The course is a part of Wyandotte's technical training program to keep its field personnel conversant with new developments and for reindoctrination in company policies and techniques. Sales supervisors from Los Angeles, Philadelphia, Detroit, Chicago, Seattle, San Francisco, Dallas and Houston also attended.

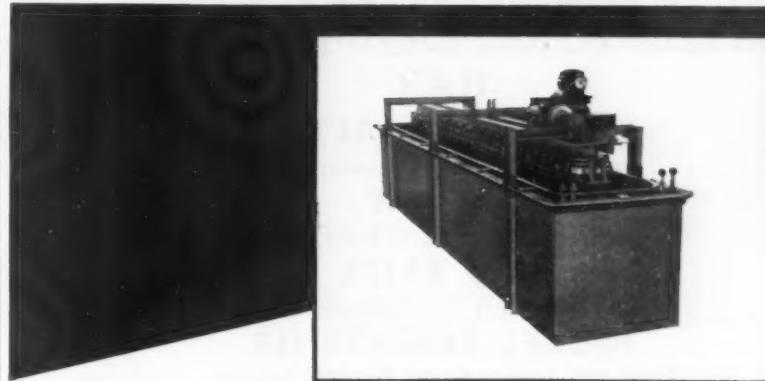
Patushin Aviation Corp., Los Angeles, recently completed installation of a new dipping line to speed production and finishing of airplane parts. It is a conveyor dipping line for use on jettisonable plane fuel tanks. The installation is designed to permit dipping tank parts into five baths of corrosion resistant chemicals.

International Rectifier Corp. announces that a new line of Germanium Diodes has been placed in production at its El Segundo, Calif., plant after two years of development and pilot production.

The firm's announcement cites it as the first to produce a vacuum impregnated Diode and that as the largest manufacturer of selenium power rectifiers, it is now in position to produce Germanium Diodes in any quantities desired. The units now available, the company reports, embody a completely new design and are produced under novel assembly and construction techniques.

The new diode consists essentially of an inner housing of low loss phenolic material over which an outer housing of specially processed glass is assembled. Thermosetting plastic seals

## MANHATTAN RUBBER LININGS



### ...For Better Protection

Plating and pickling equipment manufacturers specify Manhattan Rubber Linings where ordinary applications do not afford adequate tank and solution protection against contamination and corrosion. Proof of the dependability and long life of Manhattan Rubber Linings is their record of giving continual, uninterrupted service for as long as 25 years or more.

Made from calendered sheets in required thickness of natural or synthetic rubber, Manhattan Linings eliminate plating "risks" . . . give longer life

and more protection . . . eliminate stray currents. Every lined tank is tested to 15,000 volts to detect imperfections.

As a result of over half a century of experience in meeting the needs of equipment manufacturers, Manhattan has developed the most dependable and economical rubber linings with an exclusive rubber-to-metal bond that is inseparable.

For linings which meet your most exact requirements of economy and dependability, specify "Manhattan Rubber Linings."

RUBBER LINING PLANTS AT PASSAIC, N. J. AND NORTH CHARLESTON, S. C.



MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

**RAYBESTOS-MANHATTAN, INC.**

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles • Teflon Products • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

are used in the ends. This construction, the manufacturer points out, renders superior moisture resistant characteristics as well as affording outstanding electrical isolation from adjacent circuitry.

The company adds the information that excellent shock and vibration resistant characteristics are obtained by the use of a non-skid germanium crystal surface, double housing, precision formed whisker and the thermo-setting plastic end seals. Other features cited are the rugged construction, welded anchor pins, self-insulating case and the absence of plating to cause flaking. The units are now in production in general and special types.

### SHOP PROBLEMS

(Continued from page 114)

#### Copper Bath

**Question:** What would cause the ammeter in my rectifier to read 15A at 2V when it should read 30A? I am plating with a sulfate solution: 32 oz. CuSO<sub>4</sub> and 7 oz. H<sub>2</sub>SO<sub>4</sub>. When this condition exists, would you bring up the amperage by using more voltage?

L. H. H.

**Answer:** If you formerly obtained 30 amperes at 2 volts and are now getting only 15 amperes at this voltage, it might indicate that the free sulfuric acid content of your solution has dropped, as it normally will in acid copper baths. The copper sulfate may also be low and can be checked with a

MANUFACTURERS OF  
ALL PURPOSE  
**CLEANRITE**  
METAL CLEANERS AND BURNISHING COMPOUNDS

**HAY**

**CROMORE SALTS**

Increases Chrome Throwing Power

**GLO DIP**

For Bright Dipping Copper, Brass and Bronze

**CAD BRITE**

Liquid Brightener for Cadmium or Zinc

**NICKEL BRIGHTENER**

Easily Maintained. Bright Deposits Assured.

SPECIALISTS IN THE ENGINEERING OF  
ELECTRICAL IMMERSION TYPE TANK HEATING  
Call on Us for the Answer to Your Difficult Problems.

Distributor for the Best in  
**PLATING AND POLISHING**  
**EQUIPMENT AND SUPPLIES**

**COMPLETE PLATING PLANTS ENGINEERED**

Servicing the Finishing Industry  
1935 - 1953



hydrometer. The solution should read about 21 to 22 degrees Baume.

We would also suggest that you check to see if you have sufficient anode surface in your tank and also that you clean all contacts.

#### Depositing Titanium

**Question:** We are interested in the possibility of electrodepositing titanium onto such metals as iron, aluminum and magnesium. Any information and references that you care to pass along to us would be appreciated.

W. B. R.

**Answer:** We know of no practical method for electrodepositing titanium from aqueous solutions, although thin coherent deposits were claimed by Haissinsky & Emmanuel-Zavizziano

(Comptes Rendus, 204, 759, March 8, 1937).

If we could deposit titanium there wouldn't be a nickel shortage in the plating industry.

#### Hard Chromium Plating

**Question:** Please send me ASTM specification B-177-45T, Tentative Recommended Practices for Chromium Plating on Steel for Engineering Use.

G. A. E.

**Answer:** Copies of this specification are obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Recent editions of the Metal Finishing Guidebook-Directory have a section on the subject by Arthur Lo-

gozzo, which will provide you with the same details.

#### Tank for Concentrated Acid Mixtures

**Question:** In the June, 1952 number of Metal Finishing you published a very interesting article about tanks made of phenolic, furane and polyester resins, also of polymethyl methacrylate and of rigid polyvinyl chloride, the first two cast from mixtures of the liquid resin and asbestos (page 117), and also about Laminex Fiberglas tanks (page 134).

We should be very grateful if you would kindly get us the following information: which, if any, of these tanks would resist a concentrated solution containing principally phosphoric acid with a certain percentage of sulphuric acid and a smaller percentage of nitric acid, at a working temperature of 100 to 110° C.

P. D. L.

**Answer:** We know of no plastic material of construction which will withstand concentrated solutions of phosphoric, sulfuric and nitric acid at 100-110° C. For this solution, which appears to be a bright dip, a stainless steel tank is suggested.

#### Cleaning with Kerosene

**Question:** We use kerosene in one of our finishing and cleaning operations on metal parts. The operators must handle the parts while wet, and find that the kerosene is hard on the hands, maybe because it removes the skin oils.

We will appreciate anything you can suggest that can be added to the kerosene to make it easier on the hands. We could tolerate a small proportion of oily or waxy material if necessary.

M. J. H.

**Answer:** It is our impression that addition of sufficient emollient, lanolin for example, to your kerosene to counteract the solvent action of the kerosene would result in recontaminated parts. Neoprene gloves will resist the action of kerosene.

#### Cleaning Rubber Lined Tank

**Question:** In the very near future, we are contemplating changing over a 700 gal. acid copper tank to a Watts type nickel solution. This tank has a rubber lining. Please give me the proper procedure to clean the tank and

remove all possible copper traces before making up the nickel solution in this tank.

J. I.

*Answer:* Dried copper sulfate should be washed off the tank walls first, then soak the lining with a 5% sulfuric acid solution and rinse well. Finally, fill the tank with water and heat to about 150° F., allowing the water to remain in the tank for a few days. The tank can then be rinsed out and filled with nickel solution.

## BUSINESS ITEMS

### Davies Supply Appoints Loupee Sales Representative



Dick Loupee

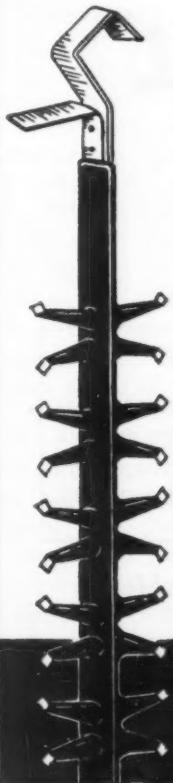
The appointment of *Dick Loupee* as sales representative in the St. Louis and Southern Illinois district has been announced by *L. A. Davies*, president of *Davies Supply and Manufacturing Co.* of St. Louis. Mr. Loupee, formerly a buyer for the *Gates Rubber Co.*, Denver, will work out of the company's St. Louis office. Coverage of this territory by Mr. Loupee will provide expanded service for Davies Company customers in the area, and is another step in a continuing program of expansion, both of facilities and personnel.

### Free Course in Electroplating

The Fall term in Electroplating at the *Brooklyn Evening Technical High School*, 29 Fort Greene Place, Brooklyn 17, N. Y., begins September 16, 1953. Laboratory experiments include analyses of copper, nickel, chromium and silver baths. Additional laboratory work provides the opportunity to

# How To Save Money With BUNATOL

It's easy to use BUNATOL No. 1002 Paste as it not only provides the best rack insulation but is also being used to insulate and protect anode baskets, pails, tank screens, fans and housings, drain boards, small tanks, valves, piping, and to repair plating barrels and other equipment. Instead of sending the work out, at great expense, do it yourself.



BUNATOL No. 1002 Paste is designed especially for insulating plating racks; that is why it makes a better insulation. The Primer is a single-coat job that saves time and labor and provides tremendous adhesion. The Paste coating gives great toughness and wear resistance, and chemical resistance to withstand all plating solutions and chemicals. Naturally, when such a fine coating is used to protect equipment from corrosion and chemical attack, it does give results.

No. 1002 Paste is a 100%-solids liquid that in a single dip coat will pick up a heavy insulation. It is permanently flexible, extremely tough to stand wear and scuffing, and will withstand all plating solutions. In many cases the insulation will outlast the rack.

Perhaps we can help you save money and time. Why not write and let us send complete information about BUNATOL Paste insulation and its many uses?

**NELSON J. QUINN COMPANY  
TOLEDO 7, OHIO**

perform Hull cell experiments, pH meter operation, thickness measurement by chemical methods of zinc, cadmium, nickel, chromium. Classroom discussion covers such topics as a review of the fundamentals of elementary chemistry, tank area calculations, specific gravity and Baume readings, wetting agents, brighteners, buffer agents, pitting.

Registration begins September 14, 1953 and daily thereafter from 7:00 to 9:00 P.M. Classes meet Tuesday and Thursday nights, 6:45 to 8:15 P.M., plus about 6 Friday nights during the term. The term begins September 16, 1953 and ends January 29, 1954. Ask for Mr. L. Serota in room BW17 or 3E12.

### Bart Named Sub-Contractors for New A.E.C. Projects

*Bart Manufacturing Corp.* of Belleville, N. J. has been awarded contracts exceeding \$1,500,000 as the sub-contractor to nickel plate pipe on the multi-million dollar contract recently awarded to the Walsh-Holyoke Division of Continental Copper and Steel Industries, Inc., to fabricate pipe and equipment for two new Atomic Energy Commission projects.

One of the largest heavy industrial plating firms in the East, Bart designed the plating plant, based on the latest equipment and techniques, and will operate the steel pipe plating facilities at the new South Portland, Maine installation which will be ready for production during mid-May. Steel pipe

# GREETINGS AMERICAN ELECTROPLATERS' SOCIETY

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Clinton facilities and experience meet rigid government specifications. Your inquiries on Defense Contract work are welcome and will receive prompt, efficient attention. And all important — you will be assured of no compromises with quality, workmanship and materials.

*Let us help you with your finishing problem*

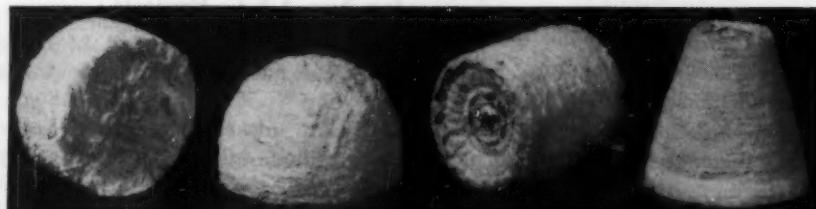
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We manufacture a complete line of buffs including full disc sewed, loose, polishing wheels and *BIAS TYPE BUFFS*.

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and fittings will be nickel plated on the inside diameter by the exclusive Bart nickel plating process which was developed by the company for the A.E.C. during World War II. Large quantities of this patented nickel lined pipe were used in the original A.E.C. project which developed the first atomic bomb, after Bart developed new plating techniques and equipment and pioneered in the installation of nickel lined pipe.

The company is presently engaged in work on several A.E.C. projects requiring nickel lined pipe and equipment. It is expected that the new contract will run for several years.

### Enthone Announces Personnel Changes

Recent changes at *Enthone, Inc.*, New Haven, Conn., include the appointment of *Hubert M. Goldman* to the newly created post of assistant to the sales manager and technical engineer; *Francis A. Schneiders* to the position of technical service manager; and the addition of *Laurence J. Durney, Jr.* and *Edward F. Foley* as research chemists in Enthone's enlarged research facilities.

*Goldman* has been associated with the company for over six years as a chemical service engineer and technical service manager. He is known to many members of the American Electroplaters' Society and other technical societies by virtue of the papers which he has presented before local meeting groups and at National Conventions. He is past president of The Bridgeport Branch, American Electroplaters' Society and a member of the American Chemical Society, Electrochemical Society, and Alpha Chi Sigma. Prior to his connection with Enthone, he was active in the metal finishing field for 10 years as technical director of a large job finishing concern and chemist and plating supervisor in a Stamford, Conn. manufacturing organization. *Hubert* resides in West Haven, Conn.



Hubert M. Goldman



Francis A. Schneiders



**Study ALL angles and**

# ONE FINISH STANDS OUT

## **Study METAL COST**

ZINC is the cheapest metal to plate. Even with LUSTER-ON Passivating Dip added it still COSTS LESS than Cadmium, Copper, Nickel and Chrome or any other finish that we know of today.

## **Study TIME COST**

Zinc plate with simple Luster-on cold dip treatment will usually SAVE 2/3 of the PROCESSING TIME of flash copper, nickel and chrome work. **TIME COSTS YOU MONEY — SAVE IT WITH LUSTER-ON.**

## **Study POWER COST**

Zinc plate and Luster-on require no heavy power to plate or heat metals such as nickel and chrome. **YOU SAVE ON POWER USED and RECTIFIER or GENERATOR EQUIPMENT REQUIRED.**

## **Study THE FINISH**

Zinc and Luster-on, applied manually or in full automatics, can nowadays show finishes so beautiful, so gleaming that they bow to no one. Proved again and again superior to cadmium for most purposes, they rival traditional chrome.

## **Study ALL ANGLES**

You'll soon see why big companies and job shops alike agree that Zinc and Luster-on is here to stay — has established itself over the years, not just as a substitute for scarce metals. **BUT BE SURE THE PASSIVATING DIP YOU USE IS GENUINE Luster-on — "The first in the field and still the leader."**

*Write for free data sheets and send a part for free processing.*



L. J. Durney, Jr.



Edward F. Foley

Schneiders, a graduate chemical engineer from Lehigh University, has been with Enthone for three years in the research and service engineering laboratories. His field service work during this time has, for the most part, been confined to eastern United States. He is an active member of The New Haven Branch, American Electroplaters' Society, American Chemical Society, and Tau Beta Pi, honorary engineering society. Frank resides in Branford, Conn.

Durney joined the Enthone research staff on February 15 after having worked as plant finishing engineer for Sargent & Co. of New Haven for the past six years. Larry has been active in the metal finishing field since his graduation from Manhattan College in 1942 and is well known in the New England area. Prior to his appointment as process engineer with Sargent, he had been employed as chief chemist at Contract Plating Co., Stratford, Conn., and at Sulphur Products Co., and as plating foreman and plant chemist for The Propeller Division of Remington Rand Corp. He has a vast wealth of experience in all phases of metal finishing and finishing production. He is presently vice-president of The New Haven Branch, American Electroplaters' Society and a member of The American Chemical Society. Larry presently lives in Wallingford, Conn.

## **Blakeslee Adds Kashman and Thiess**

G. S. Blakeslee & Co., oldest manufacturer of degreasing machines and pump-type alkali washers, have added Henry Kashman as sales engineer. Mr. Kashman will handle the Company's New York City and Long Island territory.

Mr. Kashman's background involves considerable technical and sales experience. He served in both the Quartermaster Corps and the Corps of Engineers, holding the rank of captain. His

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for any product finish

# DU-LITE'S PHOSPRAY

a cold spray bonding solution applied with ordinary spray equipment.



Phospray eliminates cleaning, rinsing, drying and other preliminary preparation.



Phospray dries "dust free" immediately, ready for application of final finish.



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Phospray cuts processing time, reduces finishing costs, and provides an easy sure-fire bond for organic finishes on almost any metal.



Phospray is made and guaranteed by Du-Lite, the metal finishing specialists.

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Send me a sample of Phospray...  
 Send more Phospray information...  
 Have your representative call...  
  
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Company.....  
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Henry Kashman



Wilbur Thiess

army experience helped to broaden and deepen his familiarity with industrial chemicals and cleaning equipment. His pleasing personality, coupled with his knowledge of the field have won him a host of friends. He will operate out of the company's New York office.

The company also announces the addition of Wilbur (Bill) Thiess as sales engineer. Bill brings to Blakeslee

a wealth of experience in selling the type of equipment and products handled by this prominent manufacturer of degreasing machines and pump-type alkali washers. He is well-known and well respected in the trade, and is a significant addition in the company's new expansion program. His territory will be the southern half of Ohio and portions of Kentucky and West Virginia.

#### **International Nickel Appoints L. E. Grubb**

L. E. Grubb, former general superintendent of Inco's Bayonne, N. J. Works, has been appointed general superintendent of the Huntington, W. Va., Works of *The International Nickel Co., Inc.*, effective May 1, 1953, according to an announcement by Dr. Paul D. Merica, president of the company. At the same time, P. H. Flynn, who had been assistant superintendent of the company's Bayonne, N. J. Works, was named general superintendent succeeding Mr. Grubb.

Born in Passaic, N. J., Mr. Grubb attended Wesleyan University, Middletown, Conn. He joined International Nickel in 1934 as a member of the accounting department in the New York Office. The following year he was transferred to the Huntington Works, remaining there until 1937 when he was appointed auditor of the Bayonne Works. Mr. Grubb was named general superintendent at Bayonne in 1942. He is a member of the Society of Automotive Engineers, American Iron and Steel Institute, American Foundry

### **ANOTHER TOP VALUE FOR THE METAL FINISHING INDUSTRY**



#### **NATIONAL CARBON'S NEW "KARBATE" IMPERVIOUS GRAPHITE BRAND CONDUCTOR ROLL**

• Rapidly replacing stainless steel in both existing and new installations, "Karbate" impervious graphite conductor rolls offer an attractive first-cost advantage, plus many times the life of previously-used materials.

More than sixty of these rolls are now at work in the electrolytic pickling section of hot-dip tinning machines... some of them more than two years old and still going strong.

Success in this application suggests promising results may be obtained in other large-scale, continuous electrolytic operations.

For complete details of this bigger value, write to National Carbon Company.

The term "Karbate" is a registered trade-mark of Union Carbide and Carbon Corporation

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A Division of Union Carbide and Carbon Corporation  
33 East 42nd Street, New York 17, N. Y.

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#### **SOME NATIONAL CARBON PRODUCTS**

CONDUCTOR ROLLS • TANK LININGS • HEAT EXCHANGERS • STEAM JETS • SPRAY NOZZLES • VALVES  
PUMPS • ANODES • PIPE AND FITTINGS • SKIDS • HOLD DOWN ROLLS • CONVEYOR ROLLS • THERMOWELLS

men's Society and American Welding Society.

Mr. Flynn, also a native of Passaic, N. J., received a degree in mechanical engineering from Stevens Institute of Technology in 1939. The same year he became associated with International Nickel as a technician at the Bayonne Works. In 1940 he was appointed assistant foreman at Bayonne and assistant superintendent in 1942. Mr. Flynn is a member of the American Society for Metals, American Foundrymen's Society and American Welding Society.

### Lea Manufacturing Elects Officers

At a directors' meeting held recently, *Earle W. Couch* was elected president and treasurer of *The Lea Mfg. Co.*, Waterbury, Conn. to succeed *Robert S. Leather*, who was named chairman of the board.

Other officers elected were:

Vice-President—*Richard P. Crane*.

Secretary—*Henry L. Kellner*.

Asst. Treasurer—*William D. Starr*.

Asst. Secretary—*Ellsworth T. Candee*.

At a meeting of the company stockholders, *Roger E. Gay*, president of



Earle W. Couch



Roger E. Gay

the *Bristol Brass Corp.*, Bristol, Conn., was elected to the board of directors.

He fills the vacancy created by the death of *Louis M. Fuller*, who was president of *The American Abrasive Co.*, Westfield, Mass.

Mr. Gay is also president of the American Standards Association in New York City and a director of The Bristol Brass Corp., Bristol Traction Corp., Bristol Associates, Inc., Bristol Bank & Trust Co., Research Corp. of

New York and American Hardware Corp., New Britain, Conn.

He is a former member of the Economic Policy Advisory Committee of The National Association of Manufacturers and a former NAM director.

### Cowles Appoints George E. Parisho

*Cowles Chemical Co.* of Cleveland, Ohio announces the appointment of *George E. Parisho* as Cowles Techni-

## Schorithene FLAME-SPRAYED Corrosion-Resistant Polyethylene-Lined Drums Better — Yet Cost Less



### Seamless      Standard

Gallon Cap.	Inside Diam.	Inside Height	List Cost
STANDARD			
3½	11"	9"	\$ 7.50
5	11"	12"	9.50
15	15"	20"	17.50
20	18"	20"	24.50
30	18"	27"	29.50
55	22"	34"	36.50
SEAMLESS			
30	18"	27"	40.00
50	22"	34"	52.00

Covers \$4.00 extra

Order from us or your distributor. Unless rated firm, payment with order. No COD's.

We do Custom Spraying of Tanks, Pumps, Agitators, etc.

## SCHORI PROCESS



## IOLYTE LAMINATED FIBERGLASS TANKS Fabricated to Your Specifications!

- NO MOLDS NEEDED — Made any size, any shape, at no extra cost and no loss of delivery time.
- UNIFORM DIMENSIONS — NO TAPERING — Dimensions are same at bottom and top . . . means larger capacities than tapered molded tanks.
- FLANGES, DAMS, etc. — Can be inexpensively equipped with flanged connections, holes, overflow dams, baffles, separations, etc.
- NO REINFORCEMENT PROBLEM — IOLYTE tanks can be reinforced in any manner — reinforcements for rigidity can be angles or channels of any size and can be horizontally, vertically, or diagonally mounted.

### OTHER SUPERIOR FEATURES

IOLYTE Ducts, Hoods, and Dampers can be fabricated in any dimensions, any curves, any lengths.

Write for literature, prices, other information.

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Distributor Territories Open

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Factory: 59-31 54th St., Maspeth

cal Man in the Metal Cleaner Department for the sales territory of Southern Illinois and St. Louis, Missouri.

Parisho is well qualified to give valuable assistance to industrial metal working companies, having had extensive experience in metal working and finishing industries. Mr. Parisho, his wife and three children live at 8378 Buchanan, Venita Park, St. Louis 14, Mo.



George E. Parisho

### Johnson's Wax Promotes Two in Industrial Sales

James B. Carse, Industrial Products Department manager for *S. C. Johnson & Son, Inc.*, has announced the appointment of John C. Tarvin as field sales manager and Raymond F. Farley to the post of Western regional supervisor.

In his new post Tarvin will supervise throughout the United States the marketing and distributing of Johnson's industrial products which include metal-working lubricants and coolants, product finishes, corrosion inhibitors, furniture waxing compounds and agricultural waxes.

Farley, who replaces Tarvin as Western regional supervisor, will supervise the selling of the company's industrial products throughout the West-Central states.

Tarvin has been a member of the company for 12 years and has been selling their industrial products since 1944.

Farley joined the company in 1951 as an industrial products sales representative in New England. He was moved to the Racine office in 1952 as a wax lubricants specialist.

### Promat Appoints New District Manager

John E. Manning has been appointed Western District manager for *Promat Division, Poor & Company*, Waukegan, Ill., electroplating chemicals and processes. He was formerly employed by the *Sundmark Supply Co.*, Los Angeles, and the Wolverine Brass Works, Grand Rapids, Michigan, as a process engineer. Mr. Manning re-



John E. Manning

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#### SAVES LABOR—Stops Losses caused by over-heating

Automatically controls temperature of liquids or air at any point desired. Needs no compressed air or electricity for its operation.

3 Plus Values give you more for your money: 1) Easy to read 4" dial thermometer shows temperature of liquid or air being controlled, makes it easy to adjust regulator for proper temperature. 2) Has valve stem lubricator. 3) OVER-heat protection.

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### IRITOX CHEMICAL COMPANY

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NEW YORK 3, N. Y.

WAtkins 4-1977

ceived his degree in Chemical Engineering from Michigan State College.

#### Hanson-Van Winkle-Munning Appoints New District Sales Manager

*Hanson-Van Winkle-Munning Co.*, Matawan, N. J., announces the appointment of *J. D. Kershaw* as district sales manager for Ohio. His headquarters will be in Cleveland, 308 Engineers Bldg.



J. D. Kershaw

Kershaw moves from Grand Rapids where he served as Western Michigan sales representative for H-VW-M for eight years. Before joining the company in 1945, he spent four years with Studebaker Corp., South Bend, Ind., where he was supervisor of plating in the aviation division.

He is a member of the American Electroplaters' Society, and a graduate of Illinois Institute of Technology, B.S. in Chemistry.

#### Diversey Elects Officers

Clarence B. Jones has become secretary and general attorney of *The Diversey Corporation*, it was announced by *H. W. Kochs*, chairman, following the meeting of directors held April 21.

O. E. Soderberg, formerly the secretary and administrative vice president, was elected to the post of treasurer, a position vacated in November by the death of *C. E. Glasser*. Soderberg was re-elected administrative vice-president.

Other officers re-elected were: Kochs, chairman; *Lewis Shere*, president; *W. E. Noyes*, vice president in charge of sales; *F. E. Horn*, controller

and assistant secretary, and *L. A. Armstrong*, assistant treasurer.

Jones was with Standard Milling Company six years as secretary and attorney prior to joining Diversey and before that he was attorney for Columbia Steel Company. Jones holds a B.A. degree from Yale University and a law degree (J.D.) from Northwestern University.

In addition to his new position at



Clarence B. Jones

**\*Glo - QUARTZ**  
ELECTRIC RADIANT IMMERSION HEATERS

Heat by far Infra-Red. The scientific application of heat to all plating, pickling and phosphatizing solutions.

**Features:**

- Underwriter's Lab. approved junction box
- Midget fuses inside junction box
- Guard, holder, and junction box have Plasti Sol-type coating
- Renewable heating elements
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**"TUMBL'BRITE"**  
"We absorb the Metal Finishing Field"

**Announcing**

GRANULAR CORN COB #10, which we have added to complete our line of 3R, 34, 36 and Superfine, for heavy duty tumbling, drying and burnishing.

TUMBL'BRITE CORN COB MEAL, manufactured from clean, dry corn cobs, is used for absorbing, drying, cleaning, polishing, burnishing and in air blast cleaning in the metal finishing industry.

TUMBL'BRITE absorbs four times its own weight — can be used three to four times longer than other materials — will not stain metals or other materials.

READYLY AVAILABLE IN YOUR AREA

Ardco, Inc., Chicago, Ill.  
M. E. Baker, Cambridge, Mass.  
Z. Berberian Co., Providence, R. I.  
Haviland Products, Grand Rapids, Mich.  
Lea Mfg. Co., Waterbury, Conn.  
Manufacturers Supply Co., Providence, R. I.  
National Sawdust Co., Inc., Brooklyn, N. Y.  
Platen Supply Co., Inc., Cleveland, Ohio  
Platen Supply Co., Inc., Indianapolis, Ind.  
The Plating Products Co., Newark, N. J.  
Reynolds-Robson Supp. Co., Philadelphia 3, Pa.  
E. T. Scallill Co., Kansas City, Mo.  
A. T. Wagner Co., Detroit, Mich.

**POLISHING PRODUCTS, INC.**  
VINCENNES, IND.



O. E. Soderberg

Diversey, Jones is a member of a number of non-profit welfare organizations in Chicago. He is a trustee of George Williams College, trustee of Hadley Correspondents School for the Blind, a director of the Anti-Cruelty Society, a director and secretary of the Planned Parenthood Association, and a member of the Chicago Committee of the National Recreation Association.

### Stokes Names Manager of New Canadian Office

The F. J. Stokes Machine Co. has appointed J. William Robinson to be manager of its new Canadian branch in Montreal. The new office is located at 1179 Decarie Blvd., Montreal 9, Quebec. The Stokes management, in announcing this expansion of their sales organization, emphasized its importance in their plans for intensifying and broadening their service to their many Canadian friends and customers.

Mr. Robinson, a member of the American Institute of Chemical Engineers, Engineering Institute of Canada and The Corporation of Professional Engineers-Province of Quebec, received his B.Sc. in Chemical Engineering from the University of Saskatchewan and his Masters' degree in Business Administration from Harvard.

From 1948 to 1951 Mr. Robinson was connected with the Engineering Division of Imperial Oil Limited, in Sarnia, Ontario. From 1951 until he joined Stokes, he was with Courtaulds (Canada) Limited, in Montreal, first as manager of their commercial in-



J. William Robinson

telligence unit, and later, in charge of sales development of industrial applications for rayon.

He is a member of the Montreal Amateur Athletic Association, Harvard Alumni Association and the Saskatchewan Alumni Association.

### United Chromium Promotes Passal

Frank Passal, a member of the re-

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### HOW TO SAVE 40% to 70% on the cost of work gloves

In handling materials that are sharp, abrasive or slippery, or where oil, grease, acid, caustic, solvents or heat are present, properly job-fitted gloves of coated fabric far outwear canvas, leather and unlined rubber gloves. Cost-savings of 40% to 70% are usual, in addition to safer work-handling and improved employee attitude.



No. 93 glove has NEOX (reinforced neoprene) coated palm. Lasted 26 shifts handling stainless coil strips vs. 2 to 3 shifts with canvas gloves. NEOX combines exceptional resistance to cutting, abrasion, chemicals and heat, with flexibility and good grip. Also available in many fully coated styles for liquid-proof service.

No. 363 gauntlet coated with DUROX, a 50% longer wearing plastic. Retains its grip when wet. Ideal for contact with oil, other slippery liquids. Note hand-fitting shape, preflexed fingers, wide wing thumb.

Make this simple free test: Send a brief description of your operation, materials handled and temperature condition. From 32 types of Edmont work gloves, we will recommend the glove that correctly fits your condition and forward samples, without cost, for testing on-the-job. Address

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**GLOVES**

Edmont Manufacturing Co.  
1276 Walnut St., Coshocton, Ohio  
World's largest maker of coated industrial gloves

search staff of *United Chromium, Inc.*, since 1934, has been promoted to assistant director of research, Plating Division. Mr. Passal has contributed greatly to the development of many United Chromium products and processes now widely used in the metal finishing industry. Among the better known ones are Unichrome SRHS chromium, porous chromium, and Unichrome pyrophosphate copper. He



Frank Passal

was co-author of the paper "Self-Regulating High-Speed Chromium Plating" presented at the Annual Convention of the *American Electroplater's Society* at Boston in June 1950.

Mr. Passal, presently a member of the A.E.S. and an associate member of Sigma Xi, national honorary scientific fraternity, is a holder of the Bachelor of Science degree of the University of Pennsylvania from which he was graduated with honors in 1935. He attended that university on a four-year Charles Ellis scholarship.

Mr. Passal's long association with United Chromium and his extensive experience in electroplating research make him eminently qualified for his new responsibilities.

#### Tumbling Sales & Service Co. Changes Trade Mark

In order to avoid any possible confusion between their products and those of others, *Tumbling Sales & Service Co.* have discontinued the use of the name *Tesco*.

Effective immediately, the trade mark "Esbec" will apply to their *Esbec Tumbling Division* in Meriden,

Conn., and to a variety of equipment and supplies which will be marketed under this name.

#### Anderson Named New England Representative for Bart Messing

*Donald M. Anderson*, of Attleboro Falls, Mass., has been named New England representative for *Bart-Messing Corp.*, manufacturers of Sel-Rex selenium rectifiers and *Sel-Rex Precious Metals, Inc.*, manufacturers of



Donald M. Anderson

**FILTER 50-1500 GAL/HR  
ANY ELECTROPLATING  
SOLUTION**

**NO ROUGH DEPOSITS  
NO PITTING**

**Model LSI-10**  
Cap. 100 gal/hr  
H.T. Lucite  
Filter Assembly  
Portable, Wt. 40 lb.  
12" x 16" x 16"

**SETHCO FILTER PUMP LSI-10**

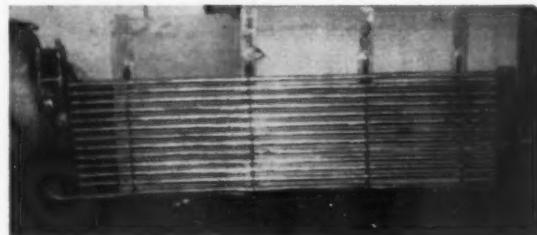
- Filter solutions from pH 0 to pH 14.
- No loss of precious solutions.
- Stainless Steel (316) or Hastalloy Pump and Fittings.
- H. T. Lucite, Stainless (316), Rubber-lined, Haveg or Setherin® Resin Filter Assemblies.
- Cotton, Dynel, Orlon, Nylon, Spun Glass, Porous Stone or Porous Carbon Filter Tubes.

Distributors in All Principal Cities

\*Reg. App. for Write for literature

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STORTS coil men work in all metals — iron, steel, lead, brass, copper, nickel, Monel, stainless, etc., to make better coils in all sizes and all shapes. Specials are routine. For example, the coil shown here has a special and unusual feature: the flow is first through the top four pipes, back through the middle bank of four, then through the bottom bank of four to the outlet; three passes across the tank. Storts experience in making many thousands of different coils is your assurance of satisfaction on your coil needs.

**STORTS**  
WELDING COMPANY  
INCORPORATED

Manufacturers of Welded Fabrications to Specification

38 Stone Street  
MERIDEN, CONN.

salts and solutions for precious metals plating of Belleville, N. J.

Mr. Anderson has been active in the electroplating and finishing field for the past 14 years, both in sales and production work, with particular emphasis on precious metals and decorative finishing.

Prior to joining the Bart-Messing and Sel-Rex organization, Mr. Anderson was employed as Boston-Attleboro representative for *Baker Bros., Inc.* In his new capacity he will handle sales of selenium rectifiers, plating and polishing equipment and supplies, and precious metal plating salts and solutions, including Sel-Rex Bright Gold Process and Sel-Rex Bright Rhodium the two latest developments of Sel-Rex Precious Metals, Inc.

#### Hugh V. McGuire Joins Jack Steele Co.

*Jack Steele Co., Architects-Engineers, Philadelphia, Pa.,* has announced the appointment of *Hugh V. McGuire* as sales representative to their staff.

Mr. McGuire has been formerly with the *Hanson-Van Winkle-Munning Co.* for the past thirteen years. His work has covered export trade, graphic



Hugh V. McGuire

arts, plant process layout, and specialized engineering sales. He has an AB degree from Rutgers University and holds a reserve commission in the United States Naval Reserve as a naval aviator.

In his new position with Jack Steele Company, Mr. McGuire will be responsible for coordinating the newly extended engineering facilities for metal finishing which includes plan-

ning and consulting services for the process layout, as well as all utilities and building structures.

#### Kimball Promoted by Snell

*Dr. Foster Dee Snell*, chairman of the board and president of *Foster D. Snell, Inc.*, announced recently that *Cyril S. Kimball* has been promoted from the position of vice president to executive vice president of the corporation.

Mr. Kimball, a graduate of the University of Rhode Island, started his career with Foster D. Snell in 1926. He became vice-president of the corporation in 1932 and has held that position continuously since that date. A party in his honor two years ago marked his twenty-fifth anniversary with the company.

Mr. Kimball, who is known as Cy to his many friends, has been successively honorary secretary, vice-chairman, and chairman, of the American Section of the Society of Chemical Industry, and vice-president of the Society of Chemical Industry. He has also held offices in The American Institute of Chemists and The American Chemical Society. He is vice-chairman

## BEAM-KNODEL CO.

Metropolitan Distributors

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Complete Service for Metal Finishing

Products Listed Below Available in New York  
Stock With Reasonable Exceptions

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Brushes	Rouge	Copper Salts
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MAIZO Drying Materials	LEA Buffing & Polishing PRODUCTS
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Simplify your bright zinc plating  
with

*McKeon's*  
*Zinc-Brite*  
TRADE MARK REG'D.

as a constant cleanser and purifier

It will:

1. Precipitate heavy metal impurities.
2. Co-precipitate copper impurities, eliminating need for zinc dust treatment.
3. Minimize need for decanting or filtering.
4. Precipitate excessive carbonates.
5. Reduce Brightener consumption.

Try a 5-gallon can, \$15.00; or a 15-gallon drum, \$42.75, on 30 days' approval.

*Sulphur Products Co. Inc.*  
Greensburg 7, Pa.

of the Wax and Floor Finishes Division of the Chemical Specialties Manufacturers Assn. Currently he is a member of the publicity committee of The American Council of Commercial Laboratories. Mr. Kimball's field is chemical specialties products, both industrial and household, and he has presented many papers on this subject. In this field he has been active in the development of odorless quick-drying paints, new types of wax products, and many other items. The units of the Snell laboratories constructed at Bainbridge, New York in 1950 and 1952 were laid out and supervised by him.

Mr. Kimball resides at 80 Chittenden Avenue, Tuckahoe 7, N. Y. and is the father of four children. He is active in civic affairs of his community and is a member of The Chemists' Club of New York.

#### Enthon Appoints Rhoads

*Enthon, Inc.*, New Haven, Conn., announces the appointment of Joseph E. Rhoads, Cleveland, Ohio, to the position of service engineer covering the territory of western New York and Pennsylvania, the states of Ohio and West Virginia, and northeastern Ken-



Joseph E. Rhoads

tucky. Mr. Rhoads will work in conjunction with the sales engineering staff of *R. O. Hull & Co.*, Cleveland, Ohio, who are exclusive distributors of Enthon products in this territory.

Rhoads comes to Enthon with seven years of experience in the metal finishing field and a degree of B.S. in Metallurgical Engineering. After receiving his degree from Case Institute of Technology, he spent three years with the

U. S. Navy. Then followed two years of employment with Brown-Lipe-Chapin Division, General Motors Corp., Elyria, Ohio, under the able supervision of *Dwight Overcash*. Joe then became a part owner and vice-president of The Progressive Plating Corp., Elyria, Ohio. After relinquishing his interest in this job plating company, he became general manager of The Plating and Galvanizing Co. and assistant to the executive vice-president of The Cleveland Chain and Manufacturing Co., both of Cleveland, Ohio.

In his new position with Enthon he will be responsible for the servicing of all Enthon product installations made by the active sales engineering staff of Hull and will, therefore, work closely with their engineers and chemists.

#### Travis Elected President of Handy & Harman

Judson C. Travis was elected president of *Handy & Harman*, refiners and fabricators of precious metals and their alloys, at the organization meeting of the newly-elected board of directors held here recently.

He took over his new duties as chief

**DANIELS UTILITY BATCH PLATER**

**DANIELS**

New multiple DANIELS PLATING BARREL unit designed to handle small lots of work economically. Unit consists of a multiple of small size barrels, each independent of the other. Individual removable tanks. Cylinders allow plater a wide range of cleaning, pickling and plating applications.

Send for complete details on this and other plating equipment.

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947 N. Cicero Avenue  
Chicago 51, Illinois  
EVERYTHING FOR PLATING PLANTS



Judson C. Travis

executive officer on May 1 after thirty-five years of service with the company. During the past year he served as vice-president and general manager, and prior to that he had been executive vice-president since 1950.

Mr. Travis succeeds G. H. Niemeyer, who has been president for the past fifteen years and who had asked to be retired from the presidency this year.

Active in the company affairs for 53 years, Mr. Niemeyer will continue as a member of the board of directors, chairman of the executive committee, and president of *Handy & Harman of Canada, Ltd.*, a wholly-owned subsidiary. Mr. Niemeyer said yesterday that he also intends to continue his activity in the jewelry trade associations. He has long been a prominent figure in these organizations.

All other officers of the company were re-elected; C. W. Handy, chairman of the board; H. W. Boynton, vice-president and treasurer; J. W. Colgan, vice-president in charge of sales; F. C. Jones, vice-president in charge of production and research. These officers, with the addition of J. C. Travis, G. H. Niemeyer, R. H. Leach, H. E. Radix and T. H. Gallagher, constitute the board of directors. R. G. Jones was re-elected secretary and controller and F. H. Wemple assistant secretary.

#### William K. Sticksel Joins Diversey Corporation

William K. Sticksel has joined The Diversey Corporation's metal industry

department as sales representative for the Chicago area. The announcement was made by R. L. Shannon, manager of the department.

Sticksel is well known in the metal working field. Previously he was with the *C. M. Hall Lamp Co.* in control and development work and, just prior to joining Diversey, with the *Ulylite Corp.* where he served one year in laboratory and service work in Detroit.

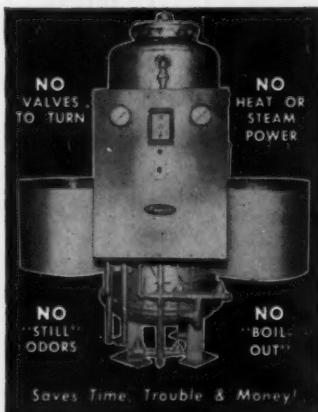


William K. Sticksel

## CHEMICALLY PURE WATER

For Plating Solutions & Hot Water Rinses

### THE LOW COST, NO MUSS, NO FUSS WAY!



Saves Time, Trouble & Money!

The new Penfield Mono-Column Demineralizer pictured above performs all its operating functions automatically — even accomplishes complete regeneration, including automatically recutting in effluent, with one turn of a switch. Write for full information on units of any desired capacity from 10 to 10,000 gph.

**PENFIELD MANUFACTURING CO., INC.**

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FILTERS • SOFTENERS • DEGASIFIERS • DEMINERALIZERS

Penfield "Planned Purity" PAYS!

### No "Extras"! No "On-The-Job" Assembly Problems!

Penfield Demineralizers are shipped ready-to-operate. Standard equipment includes MONEL METAL regeneration tanks and all necessary gauges, flow meter, conductivity meter, etc. Simply connect the completely "packaged" unit to service lines and start operation.

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Let DAYBRITE solve your COPPER PLATING problems. Check these important, money-saving features:

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DAYBRITE is time tested and proven. Write now for technical bulletin giving full details.

**DAYTON BRIGHT COPPER CO.**

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Dayton 4, Ohio

one year of technical service in Chicago and 5½ years as Chicago sales representative. He is thoroughly experienced in plating techniques.

#### Joseph Mazia Consultants Expand Activities

The firm of Joseph Mazia Consulting Engineers 1424 K Street, N. W., Washington, D. C., has enlarged its scope of activities by being appointed special



Joseph Mazia

technical representative of Gray Co., Inc., of Minneapolis, Min.

Gray manufactures special equipment for the transfer of fluids and semi-fluids used in the fields of protective coatings and lubrication.

Development and promotion of Graco equipment especially designed to meet the needs of the Military Establishment and other Governmental Agencies is the main new task of this firm.

Addition of the Graco line will complement the work now being done by the Mazia organization on behalf of American Chemical Paint Co., Stoner-Mudge, Inc. and Orchard Bros., Inc.

#### Cowles Appoints Director of Research

Cowles Chemical Co., Cleveland, Ohio announces the appointment of Dr. John Barry Davidson as their new director of research who joined the company in April and will be directly in charge of the research laboratories in Syracuse.

Dr. Davidson took his undergraduate work at Williams College and his graduate work at Massachusetts Insti-



Dr. John Barry Davidson

tute of Technology, where he received his Doctor's degree. He was a group leader on research projects for Sharples Chemicals, Inc. for a number of years and later was associate director of research for Plaskon Division of Libbey-Owens-Ford Glass Co. A number of patents and patent applications on surface active agents, silicones and paper-treating resins are associated with Dr. Davidson's name.

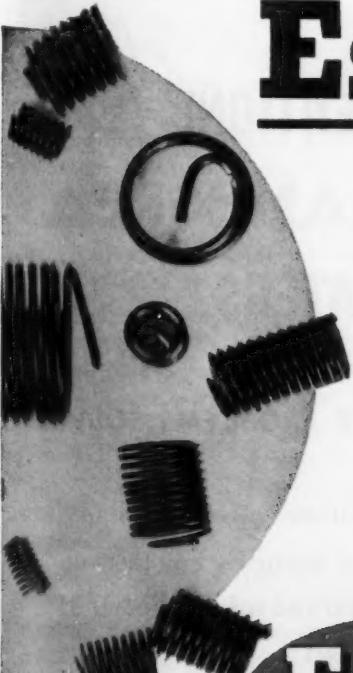
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stainless steel  
springs  
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to government  
specifications  
in addition  
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Operating costs  
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Tough Monel is highly resistant to corrosion caused by muriatic and sulphuric pickling solutions.

And it gives you years of trouble-free service. What's more, fabricated Monel equipment can be readily repaired, when necessary, for continued service life.

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INCO  
Monel  
PICKLING  
EQUIPMENT

extra life  
extra capacity  
extra safety



## MOTOR CITY PLATING NEWS

### Detroit Branch

President *H. E. Head* called the meeting to order on Friday, April 10th, at 8:10 P.M. in the Hotel Statler with

approximately 120 members and guests attending.

Assistant secretary-treasurer *R. J. Racine* read the names of six applicants

for membership. All were unanimously elected into the Branch.

In the absence of chairman *Bruno Leonelli*, *R. J. Racine* called on the

## BRIGHTER *Barrel Nickel Plating* with TRUE BRITE NICKEL BRIGHTENER

### *Increase Production*

easy to control . . . cuts down on trouble that entails costly delays.

### *Save time*

can be operated at a higher speed.

### *Reduce Rejects*

gives unbelievable uniformity of deposit in recesses . . . brighter, white color.

*Write for FREE bulletin revealing tricks on improving your nickel plating and cutting costs.*

**TRUE BRITE CHEMICAL PRODUCTS CO.**  
P. O. Box 31, Oakville, Conn.

## ATTENTION! MICHIGAN AREA PLATERS

### CYANIDE WASTE PROBLEMS SOLVED

Operating Installations meet the Standards of Recognized Agencies. For facts on efficient, economical and safe treatment of cyanide waste contact . . .

**NELSON CHEMICALS CO.**  
12345 Schaefer Hwy. Detroit 27, Mich.

membership to exert a greater effort to get more sustaining members. Detroit has only about one-half as many sustaining members as Chicago. Membership was asked to submit ideas for ways to get better support.

*Arnold Emmerich* announced that preliminary plans had been made—Stag Day party to be at Glen Oaks Country Club—bigger than ever with free golf—free breakfast—free beer—free dinner at a bigger and better location.

*Les Borchert* said that membership had increased from 491 at the beginning of the fall season to 510 at this meeting. All who helped were thanked for their efforts.

*Don Bigge* announced that the officers elected for the fiscal year 1953-1954 were as follows:

President — *L. C. Borchert*.

First Vice-President — *J. Gurski*.

Second Vice-President — *L. M. Morse*.

Secretary-Treasurer — *R. J. Racine*.  
Educational Chairman — *F. E. Olmstead*.

Board of Managers — *Glen Friedt, Jr.* (1953-1956); *F. Watt* (1953-1954); *E. A. Steegar* (1953-1955).

Delegates — *C. F. Nixon, J. Gurski, H. E. Head*.

Delegate Alternates — *Walter Pinner, L. M. Morse*.

The new officers were installed by delegate *Cleve Nixon* and were ordered to immediate duty. Before turning the floor over to the new president, *L. C. Borchert*, *H. E. Head* thanked all who had assisted him during the past year. Mr. Head was then given a rising vote of appreciation by the membership.

Educational chairman *Fred Olmstead* showed Part Three of the *International Nickel Company* film "Corrosion in Action—Passivity and Protective Films" and then introduced the principal speaker, *Allan Woodell*, Senior Statistical Quality Control Analyst, Ternstedt Division, General Motors Corp.

*Mr. Woodell's subject — Applications of Quality Control Techniques to Plating Processes* was a timely discussion of the economy, improvement in quality, and increase in efficiency possible in the plating industry by the adoption of this relatively new tool.

Woodell defined statistical quality control as a system of inspection, analysis, and action as applied to a manufacturing process. He said it in-



## BETTER COMPOUNDS mean MORE PRODUCTION and INCREASED PROFITS

Thirty years of experience developing and furnishing Polishing and Buffing Compounds to the Automobile Industry and hundreds of allied metal working firms entitles us to solicit the opportunity of working on your polishing and buffing problems.

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**DETROIT CHEMICAL SPECIALTIES, Inc.**  
101 S. WATERMAN DETROIT 17, MICH.

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ELECTRO-POLISHING CONCENTRATES

SAVE TIME . . . SAVE LABOR . . . INCREASE PRODUCTION  
SMOOHS . . . BRIGHTENS . . . DEBURRS

Removal of metal can be controlled down to .0002 of an inch.

COPPER ALLOYS . . .	ELECTRO-GLO #200
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CARBON STEEL . . .	FERRO-GLO #500

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400 Midland Ave., Detroit 3, Mich.  
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solves mathematical formulae and calculations which during the last 5 years have been simplified and condensed so that the methods can now be understood and applied by laymen.

Charts were shown citing examples of savings in plating cleaners, acids, and chemicals in Ternstedt plants by regular and frequent chemical control, the control data being charted and displayed in a prominent place in the plant.

Since success in quality control depends upon enthusiastic reception by workmen, Woodell emphasized that it was very important that the data showing improvement by regular control be plotted and put on the factory floor where everyone can see it.

It was explained also how statistical control methods may be employed for elimination of metal waste by variation in plate thickness. Thickness data is plotted from specimens selected at random. If thickness varies more than a predetermined maximum, the plating process is said to be out of control necessitating immediate corrective measures.

After numerous questions, both gen-

eral and concerning the application of the methods to specific problems, the meeting was adjourned at 10 P.M.

Refreshments were served following adjournment.

#### Nankervis Expands Operations

The George L. Nankervis Co., manufacturers of metal finishing equipment for the automotive and aircraft industries, announces the completion of its third expansion program in the past three years. The latest expansion includes a new manufacturing plant and additional engineering facilities.

Located adjacent to the main facilities, the new one-story plant provides over 10,000 square feet of manufacturing space. The new building was designed to facilitate the rapid fabrication of metal finishing equipment, such as plating tanks, racks, etc. It is equipped with two 10,000 pound bridge cranes which cover the entire working area.

New equipment in use at the plant include: arc, heli-arc and acetylene welding equipment, iron workers, nibblers, brakes, shears, punch and hydraulic presses and allied equipment.



## FILTER MEDIA FOR ALL TYPES OF PLATING SOLUTIONS

### FILTER PAPER

LABORATORY . . . INDUSTRIAL . . . Made from finest materials for accuracy and dependability . . . light and heavy weights . . . slow and fast filtering speeds . . . large stock maintained . . . cut to any size and pattern . . . samples furnished for experimental purposes.

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### ASBESTOS PADS

Quality filtering pads furnished in a range of grades varying in porosity and filtering characteristics. Sizes and shapes for all needs.

OTHER "Filpac" PRODUCTS: Filters, stainless steel storage and mixing tanks, filters, pumps, conveyors, portable agitators, fittings and filter aids.

WRITE TODAY for further information and samples!

We will be pleased to discuss your filtration supply and equipment problems without obligation.



**FILPACO INDUSTRIES**  
**The FILTER PAPER CO.**

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## "Rockwell" Greetings

TO DELEGATES AT THE

## 40th Annual A. E. S. Convention

**DOMESTIC "VIENNA" LIME**  
**GAS FIRED DOLOMITE FOR PURITY**

**ABRASIVE FOR USE IN**

**Compositions and Steel Polishing**

Inquiries—Domestic and Foreign—Solicited

**ROCKWELL LIME COMPANY**  
Quarries  
MANITOWOC  
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CHICAGO 1, ILL.

Engineering facilities have been increased by the equipping of an additional 3,000 square feet of engineering space in a new building near the main plant. Engineering capacity has been doubled, both in area and personnel, to meet the increased volume handled by the company.

Extensive expansion of both engineering and manufacturing facilities was necessitated by the increased demands for metal finishing equipment and system installations.

#### **Currier Purchases Cleaner Business**

*Farnsworth Currier*, president of *Currier Company*, Oakland, Calif., announces the purchase from *Vokar Corp.* of Dexter, Mich., of their "Dee Tee" cleaner business in its entirety. This equipment is used for vapor degreasing automobile differentials and transmissions. Production is scheduled to start in Oakland soon after June 1st.

#### **J. J. Siefen Appoints Sales Engineers**

*A. E. (Ed) Smith and Harvey Blizzard*



**A. E. Smith**



**Harvey Blizzard**

*zard* have been appointed sales engineers by *J. J. Siefen Co.*, manufacturers of liquid buffing and polishing compounds.

Mr. Smith will handle company business in Indiana and lives at RR No. 2, Box 10, Elwood Ind. Mr. Blizzard will handle company business in eastern Detroit and northwestern sections of Ohio and will locate at the

home office, 5657 Lauderdale, Detroit 9, Mich.

#### **Abrasive Belt Splicer Gets New Distributor**

Sales and distribution of the recently improved Econaway abrasive belt splicer formerly available from *Econaway Mfg. Co.* are now being handled by *Aget-Detroit Co.*, 801 Main St., Ann Arbor, Mich.

## **KNAPP ANNOUNCES Three New Developments**

### **\*FERROLUM ANODES**

### **\*FERROLUM GAS HEATERS**

### **LEAD PLATE HEATERS**

For the Chrome Plater



#### **FERROLUM ANODES**

Permanently Rigid — Excellent Conductivity — Lighter in Weight — Long Life — Economical.

#### **FERROLUM GAS HEATER**

Low fuel cost, simple to operate, direct fired.

#### **LEAD PLATE HEATER**

High efficiency, low steam pressure. Large heating surface — Economical.

\*Ferrolum is bonded lead clad steel.

**KNAPP MILLS, INCORPORATED**

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## **RAMPE TWIN PRECISION BARREL FINISHER**

"THE MOST MACHINE FOR THE LEAST MONEY"



This sturdily built Barrel Finisher will handle steel burnishing balls in both barrels — is amply powered by a  $\frac{3}{4}$  H.P. 220 volt 3-phase motor for standard  $10\frac{3}{4}'' \times 17''$  barrels or larger barrels, as desired.

Safety covers for barrels prevent pressure build-up. Starting button is water proof. Has ball bearing variable speed drive. 2 tote boxes are standard equipment, — also perforated covers for barrels. Lined barrels are coated with vinyl plastic.

WITH  
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**\$535.00**

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**\$615.00**  
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Cleveland, Ohio

Write for literature and complete information.

**RAMPE MANUFACTURING CO.**

3328 ST. CLAIR AVE.,

CLEVELAND 14, OHIO

## Udylite Names Three to Top Posts

In a move made necessary by a recent expansion program, *Udylite Corporation* announced that *L. K. Lindahl* was relinquishing his duties as president to devote full time as chairman



*L. K. Lindahl*



*Clyde H. Reeme*



*Lawrence V. Nagle*



*Arthur L. Barak*

of the board, and that *Clyde H. Reeme* would assume the presidency.

In other Udylite shifts, Lindahl announced the appointment of *Lawrence V. Nagle* as executive vice-president and *Arthur L. Barak* as treasurer.

Reeme, born in Tiffin, Ohio, has been with the company since 1927 when he joined the firm as auditor. He was named assistant treasurer in 1929. He became vice-president and treasurer in 1938 and has served in that capacity up to his recent appointment.

Nagle formerly was vice-president and general sales manager. He has been with the company since 1927, coming from the United Autographic Register Company.

Barak, a native of Boston, Mass., joined the company in 1935. He succeeded Reeme as assistant treasurer in 1938. Barak was with Federal Motor Truck Company before his association with Udylite.

### James Gerity, Jr. Elected Director of Schultz Die Casting Co.

*James Gerity, Jr.*, president of *Gerity-Michigan Corp.*, plating and finish-

ing company (Adrian, Mich.), has been elected a member of the board of directors of *Schultz Die Casting Company* (Toledo, Ohio). He is one of the founders of *Schultz Die Casting*, which was incorporated in 1930, and has been secretary of the company since its organization. Mr. Gerity's



*James Gerity, Jr.*

election to the board marks a resumption of his directorship of *Schultz Die Casting*, a position he relinquished in 1951.

# SAVE UP TO 80% OF WORK CLOTHES COST!



\*Du Pont Orlon  
acrylic fiber

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ACID RESISTANT  
DU PONT  
ORLON®

- ACID AND CHEMICAL  
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- LAUNDERS AND DRIES  
QUICKLY
- NEEDS NO IRONING
- OUTWEARS COTTON  
AND WOOL 13 TO 1!

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FOR OUR  
1953  
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FREE! WORKLON'S new and fully illustrated 16 page  
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PORTABLE  
Electric Immersion  
HEATERS



ACID  
RESISTANT

Totally inert to all acids at any concentration except hydrofluoric.

Here is a time-tested all-purpose heater that can solve all corrosive acid heating problems, found in plating & pickling operations.

- Increase plating quality.
- Decrease operating cost!
- Units are light weight - portable - easily transferred.
- Installation is simple - Hang heater over side of tank and make electrical connection.

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**PYROSIL INC., CUYAHOGA FALLS, OHIO**

**Reeves Elected Vice-President  
of Wyandotte**

Election of *Robert L. Reeves* as vice-president in charge of sales, *J. B. Ford Division, Wyandotte Chemicals Corp.*, was recently announced by *Robert B. Semple*, president, following



**Robert L. Reeves**

the April meeting of the board of directors.

Reeves, 43, has been general manager of sales for the Ford Division

since joining Wyandotte in January, 1950. This division is the world's largest producer and distributor of industrial cleaning and sanitizing chemicals.

Mr. Reeves, born in Pennsylvania, was reared in Georgia and completed his education at Georgia Tech in Atlanta. He came to Wyandotte from the B. F. Goodrich Co., Akron, Ohio, where he had charge of retail merchandising throughout the nation. In addition to his eighteen years of experience in sales and merchandising, he served four years with the Navy in World War II as a Lieutenant Commander.

back covers carry excerpts from Code of Ethics and By-Laws respectively.

Table of Contents, Foreword and a page entitled "How to Find Your Consultant" precede four sections as follows:

**Section I. Classifier.** Immediately preceded by a numerical index for easy reference, this section contains about 200 items of activity with the members specializing or qualifying in the given field indicated by key numbers, which correspond with the scope pages in Section II.

**Section II. Scope Pages.** These describe page by page each member's qualifications and activities.

**New Section III. Unusual Laboratory Equipment owned by Members.** This new section gives valuable information on rare equipment owned by members and is arranged in alphabetical order.

**Section IV. Index.** (a) Alphabetically by members, including names of organizations with which they are affiliated; (b) by geographical location, including branch offices, domestic as well as foreign, earmarked by an asterisk. This should be of great value to industry in foreign lands seeking

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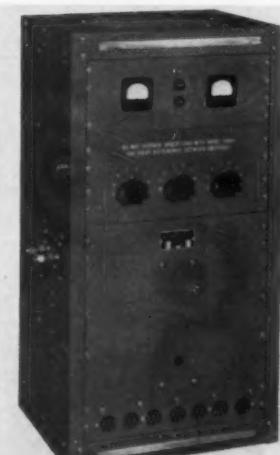
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## Associations and Societies

### AMERICAN ELECTROPLATERS' SOCIETY

A talk on the use of brushes for finishing metal parts was presented at the May 13 meeting of the Los Angeles Branch by P. A. Malling, western division district sales manager of the Osborn Manufacturing Co.

The session was held in Rodger Young Hall and drew an attendance of 77 members and guests.

Mr. Malling offered the most comprehensive discussion on the important role brushes play, or can play if selected properly for the work in-

tended, which has been heard by the branch in a number of years.

In his opening, he explained that in addition to speaking in behalf of his firm, he represented the American Brush Association, and welcomed the opportunity in behalf of the brush industry to present to Southern California platers the developments that have occurred in industrial brush design and manufacture, particularly during the past seven years, when the most important advances have been made.

He discussed the various types of brushes and their applications in sequential order. He started with power driven brushes, the use of which he said, has increased substantially in recent years due to the diligence of platers in familiarizing themselves with brush requirements and exercising more care than in the past in selecting proper brushes.

The speaker defined a power brush as a tool that works on the surface or edge to roughen or smooth, remove a burr or refine the surface. A power brush, he emphasized, is not intended to remove any appreciable amount of surface in order to arrive at a specific

diameter. If that point concerning power driven brushes is remembered, plating shop owners will have less difficulty in selecting the right brush for the right job, he said.

Mr. Malling cited its uses for removal of scale and/or burrs, removal of discolorations, roughing or smoothing, finishing or refining a surface, or imparting a finish, such as a satin finish to aluminum.

The speaker suggested platers use the following measuring sticks when selecting brushes:

a Consider the material on which the brush is to be used—steel, aluminum, plastic, etc.—for each of which a directly suitable brush is available.

b Determine the limitations and tolerances that are to be maintained and select the brush with that in mind.

c Analyze the type of equipment available in the shop—stationary grinder, bench grinder, flexible shaft—and base the selection of brushes to a good extent on their possible use with machinery already on hand.

d Have it clear in your mind what you expect the brush to do for you, what product rate you want, etc.

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Mr. Malling next submitted for inspection to the audience, and described the characteristics of, each of various type brushes, as he passed them down the line. These samples included:

Unit type wire brush, which he said is designed for use on flat surfaces; narrow faced wire brush, for use on irregular faced or corrugated type surfaces; knotted type, which supplies a rocking action for use on rugged work and for removing scale or heavy burrs. Fiber type brush, cord string brush, horse-tail and deburring brushes were also described and their specific applications explained.

"Once you have made your brush selection and find out what it can do, do not be discouraged if the first run or so does not work out perfectly," Mr. Malling said. "Brushes must be adjusted according to an individual shop owner's needs and the type of work he is doing. If the brush is too slow, increase the r.p.m., or increase density of wire, or reduce the surface speed, increase the length of wire diameter that will fit your equipment, use the finest gauge wire consistent with your needs, and use the highest r.p.m. practical with safety."

At the conclusion of his talk, Mr.

Malling presented a film which showed what type surfaces can be treated with power brushes and some current power brush applications. A question-and-answer period followed.

The business session was presided over by *John Millhorn*, plating department supervisor for *Mefford Chemical Co.*, Los Angeles. John's first full meeting in the chair since his election in April was made notable by the initiation of eleven new members. These are:

*Leo Missel*, Menasco Mfg. Co., Burbank; *H. J. Reading*, Kaiser Steel Co., Fontana; *Willard Heinicke*, Kwik-Set Locks, Inc., Anaheim; *Irvin E. Koat*, Manufacturers, Detroit, Mich.; and the following from Los Angeles: *D. J. Collyer, Jr.*, Duriron Co.; *Ira Edwards*, Valley Anodizing Co.; *Norris Freeman*, Atlas Plating Co.; *George R. Bouffard*, Barber-Webb Co.; and *Glenn O. Mallory*, Warren G. Balzer and *Norman Dieball*, L. H. Butcher Co.

The Branch voted approval of a motion to appropriate \$100 toward the traveling expenses of the three delegates to the national convention, who are *Richard Wooley*, *Morton Schwartz* and *Earl Arnold*.

As chairman of the Branch Re-

search Committee, Schwartz reported receipt of a hundred dollar check from the American Society for Metals for use as the Branch saw fit. The suggestion was approved to use the money to defray the cost of a sustaining membership in the name of the A.S.M.

#### Indianapolis Branch

The annual Columbus, Ind. meeting was held at the Arvin Cafeteria on May 6, 1953. One hundred and five members and guests enjoyed a delicious dinner and a fine program. *John Holland* was in charge of this meeting and it is agreed he did an excellent job.

At the business meeting one new member was voted into the society. He was *Robert R. Smith*, 956 N. Hawthorne Lane, Indianapolis. Mr. Smith is with the Lynn Chemical Co.

*Rex Oyler* made a motion that the membership go on record as thanking all committees for a fine educational session and dinner dance. *Les Reynolds* seconded this motion and it was passed. Two hundred fifty-seven tickets were sold for the affair.

Our president *Don Patrick*, stated that at a meeting called previously of the officers, delegates and board of managers, that the delegates are to go

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to the national convention uninstructed on any issues presented. They are to vote as they choose. Approximately twelve members from the Branch plan to attend the convention.

As this is the last meeting of the present year, Don Patrick expressed his thanks to the Branch for the splendid cooperation given him the past year. He stated he was highly honored by his serving the group. *Al Kriese* presented Don with the past president's pin.

As the election of officers is the main business of the evening, the following tellers were appointed: *Ed Bruck*, *Al Kriese* and *Walter Gulleon*. The results of the election was as follows:—

President — *Abraham Max*.

1st Vice-Pres. — *Elmer Lundberg*.

2nd Vice-Pres. — *Herb Kennedy*.

Secretary — *Edna Rohrabaugh*.

Treasurer — *Carl Niehaus*.

Librarian — *Roman C. Bender*.

Board of Managers — *Bert Hawhee*, *Robert C. Bruck*, *John M. Hood*, *Donald L. Patrick*

Discussion and comments followed

about changing the annual Columbus meeting to the fall of the year, perhaps in October. *Tom Evans* gave us a hint that the coming October meeting might be at the Brown County State Park with steak dinner and square dancing. We all hope it will be agreeable to the Branch. This will be definitely settled in the September meeting.

The program of the evening was a demonstration of colored television in the Arvin Industries Auditorium. *Robert MacGregor* of Arvin gave facts, detail and costs of just what they are doing to get colored television on the market. Mr. MacGregor compared black and white television with colored television and explained the additional type equipment needed. He believes the colored television will be on the market before too long at a much lower cost than the present prices, also with the government permission to use other than the CBS kind. John Holland expressed his thanks to the group for their support of this meeting and to Mr. MacGregor for his very fine demonstration.

Secretary,  
*Edna Rohrabaugh*

## Chicago Branch

Chicago's April 10 meeting played host to 35 ladies. With 105 men in attendance, a very pleasant 3 to 1 ratio kept most stags busy and all the ladies on the alert! After cocktails, an excellent dinner was served and everyone then adjourned to the auditorium for the Educational Session. Attendance prizes for the ladies were drawn by Mrs. Marion Longfield with Mrs. Frances Seebright taking first prize, a lovely handbag. Mrs. Walter Warner won a coffee serving set and Mrs. Ed Weil received a table centerpiece.

*Joe Andrus* of Croname, Inc. will guide Chicago's destinies during the coming year as president of this branch. He will be ably assisted by *Elmer Olson* of Oakite as 1st vice-president and *Ed Stanek* of Belke Mfg. Co. as 2nd vice-president. *Paul Glab* of Northwestern Plating Works continues as secretary-treasurer, while librarian duties will be discharged by *Russ Harr* of Western Electric Co.

*H. A. Gilbertson*, revered member of Chicago Branch and former national society president, now has a pot. It

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seems hard to believe that Mr. Gilbertson could have continued his labors for A.E.S. all these years without having a pot of his own. It has never been clearly established whether he has used other member's pots or whether he just did without—but it makes little difference now because, as we said before, Mr. Gilbertson now has a pot he can call his own! If you haven't guessed by now, H. A. Gilbertson became a member of that exclusive society lovingly labeled "The Order of the Pot." In making the presentation, *Walter Pinner* made a humorous but clear distinction between pots with handles and pots without handles. Needless to say, Mr. Gilbertson's pot has a handle. It is also gold plated, lacquered, preserved under glass, and fittingly inscribed to commemorate his 40 years of selfless devotion to the high aims and purposes of the American Electroplater's Society. Sincere congratulations, H. A.! May your pot be filled to overflowing forever more!

Reports from retiring officers indicated continuous growth in Chicago Branch activities. Over 40 new active

members were added during the past year with the present total membership standing at over 400. Sustaining memberships were increased by 8. Financially, Chicago Branch is using black ink, due largely to the Industrial Finishing Exposition sponsored by Chicago last June and the successful annual banquet held last January. Our incoming officers have lofty targets to aim at, and our retiring officers are due an accolade for high performance under trying conditions. *Ray Ledford, Klem Petrosius, Elmer Olson, Paul Glab, Dr. Monawec, Marion Longfield, Rudy Hazucha, Art Bartman, Joe Andrus, Clyde Kelly, Len Pravel, Harold Smallman*, and every participating Chicago Branch member has earned a star and a bar for meritorious service. Well done, lads!

*Bill Carr* of Lear, Inc. gave an interesting insight into the mechanics of guided missiles and automatic pilots with his address and demonstration during the educational session. His dramatic approach to a highly technical subject kept everyone's attention until the end. His personal knowledge of the engineering drama that preceded the development of these commonly

accepted technical triumphs made for a highly exciting educational evening. Even the ladies proved interested in the intricate problems related to automatic flight and guided missiles.

*Edward O. Stanek*

#### Louisville Branch

The regular monthly meeting of the Louisville Branch, American Electroplaters Society was held Thursday, March 19, 1953 at Korfhages Restaurant, 1482 Preston St., Louisville, with a dinner served at 6:30 P.M. President, *Arthur A. Oertel* opened the business and open meeting at 8:00 P.M. with twenty-six members and guests present.

The roll call of officers was read and sergeant-at-arms *Paul DeHaven*, and board of managers—*T. K. Allison, Albert Steidel* and *G. A. Logsdon* were reported absent. The minutes of the previous meeting were read and accepted.

The technical sessions chairman, *S. J. Beyer*, reported that *Dr. M. M. Beckwith* of the *Harshaw Chemical Co.*, Cleveland, Ohio, will be the speaker for the April 16 meeting. The subject will be "Lead Tin Alloy Plating." Also a *General Electric* movie with the title



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"Three to be Served" will be shown. A. A. Oertel, president, has appointed the following to the nominating committee: *S. J. Beyer* — chairman, *Wm. Francis, Bud Eckerle, Herb Pate.*

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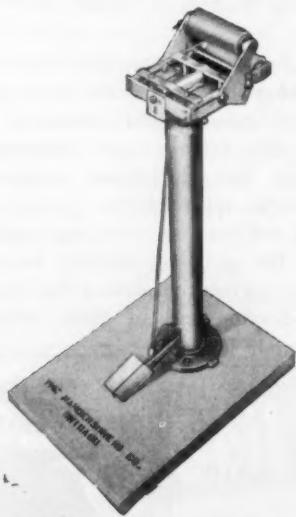
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*Ed Bruck* of the Indianapolis Branch spoke briefly about the concern manifested over the waste disposal by the plating industry in Indiana. A law was enacted that cyanide and other toxic solutions cannot be dumped into the city sewers unless the solutions were properly treated for removal. Concrete pits are now necessary under the plating tanks which hold the toxic solutions.

President, A. A. Oertel turned the meeting over to educational chairman *Stanley J. Beyer*. After a brief talk Beyer introduced *Karl Jund* of the *Globe Chemical Co.*, Dayton, Ohio, as the speaker of the evening. Mr. Jund, in his talk on chemical and electropolishing of metals, explained the history

of electropolished finishes which can be summarized as follows:

1. Zinc and lead cannot be electro-polished.
2. Electropolish with glycolic and sulphuric acid on non-ferrous metals such as aluminum, brass and copper to obtain a very bright finish.
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4. Burrs on various metals can be removed by electropolishing.

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### Cincinnati Branch

An excellent crowd of 45 men was on hand for the meeting of the Cincinnati Branch of The American Electroplaters' Society on April 22, 1953, the proceedings getting under way with the introduction by president *Robert D. Miller* of *Herman Struckhoff*, president, *LaSalco, Inc.*, who discussed "Barrel Plating." Mr. Struckhoff stressed the importance of proper loading and the necessity of taking into consideration the size of the cylinder. Pointing out that the diameter—not the length—was important, the speaker stated that a load must be as evenly distributed as possible below the center

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line since overloading would cause brown spots. Speed should be varied since it would give a better plate. Mr. Struckhoff then illustrated what would happen with improper loading by showing a film on this subject.

*Charles Wise* was asked to report on the Educational Session and Dinner Dance on March 28th. Not only from a financial standpoint but both artistically and educationally, all agreed that the event was thoroughly successful.

*Ezra A. Blount*, chairman of the nominating committee, presented the candidates for office with the following being elected:

*Carl F. Truman* — President.

*William D. Gordon* — 1st Vice-President.

*Charles Sorber* — 2nd Vice-President.

*R. K. Rarich* — Librarian.

*William Young* — Secretary.

*Charles T. Nuzum* — Treasurer.

*Robert D. Miller* was elected to the board of managers, *William Albohn* and *Stewart Chipman* being holdovers.

*Mr. Miller*, the retiring president, then introduced the new president who thanked the outgoing administration for their excellent tenure of office. He appointed *Will Loveless*, *Ezra A. Blount* and himself to make a survey for an Educational Session and Dinner Dance in 1954.

The secretary read a letter of resignation from *Earl Robbins* which was regretfully accepted. An application from *Robert G. Stringer* was presented with Mr. Stringer being elected to membership.

Letters were read calling attention to:

*Plating Magazine's* photographic contest and their "Tricks of the Trade" Column.

Branch Exhibits for the June A.E.S. Convention.

Regional meeting of the Indianapolis Branch on April 25th.

The following delegates and alternates to the June convention were appointed:

Delegates: *Ezra A. Blount*, *Wm. Gordon* and *Leroy Critchfield*.

Alternates: *Harold F. Smith*, *Wm. Young* and *Chas. T. Nuzum*.

After introducing the various guests at the meeting, the proceedings were adjourned so that members could enjoy the usual Social Hour which was sponsored by LaSalco, Inc.

*Charles Wise*,  
Secretary

#### New York Branch

The meeting was called to order by president *A. Amatore*, on Friday, April 10th, at the Hotel Statler, New York.

There being no other business, old or new, the meeting was turned over

to *Peter Veit*, librarian, who presented *R. Operousky* of the Chem-Clean Corp. Mr. Operousky spoke on "Modern Industrial Paint Stripping," which was most interesting to all.

#### AMERICAN ZINC INSTITUTE

Ernest V. Gent, executive vice-president, *American Zinc Institute*, was the recipient of the Annual Award of The

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Galvanizers Committee, which held its 29th meeting coincidentally with the annual convention of the zinc industry. The presentation of a bronze plaque suitably inscribed, marked the award to Mr. Gent in recognition of his distinguished service to The Galvanizers Committee and to the galvanizing industry.

Ernest V. Gent was born in England and as a youth came to the United States. Until 1925 he was associated and identified with the heavy chemical industry. In 1925 he became manager of the Zinc Export Association and later organized and managed similar associations.

In 1935 he became Secretary of the American Zinc Institute. In 1941 he was called to Washington and served as special consultant to the government agencies concerned with the defense and war efforts. He was elected executive vice-president of the Institute in 1948, which office he continues to hold.

The Galvanizers Committee which is sponsored by the American Zinc Institute presents an award each year in recognition of distinguished service and valuable contributions to the gal-

vanizing industry or related field, the recipient to be selected by the Council of The Galvanizers Committee which represents the sheet and pipe galvanizers in the United States and Canada.

#### NATIONAL ASSOCIATION OF CORROSION ENGINEERS

The 1955, Eleventh Annual Conference and Exhibition of the National Association of Corrosion Engineers will be held at Palmer House, Chicago, probably during the week beginning March 6. The meeting previously had been scheduled for New York City.

#### OBITUARIES

##### OLIVER P. WATTS

*Oliver Patterson Watts*, who developed the hot nickel plating bath known throughout the world as the "Watts Bath," died recently in his home in Madison, Wisconsin, at the age of 87.

Dr. Watts, dean of professors of applied electrochemistry in this country did much scientific writing, includ-

ing the general theories and applications of electrochemistry, corrosion studies, the behavior of voltaic couples, electroplating problems, and investigations in metallurgy.

#### WILDER D. BANCROFT

*Dr. Wilder D. Bancroft*, one of the founders of The Electrochemical Society, died in his home in Ithaca, New York recently at the age of 85. Dr. Bancroft was a professor of chemistry at Cornell University until he retired in 1937.

He was a pioneer researcher into the application of colloidal chemistry of the human body, founded the *Journal of Physical Chemistry*, and was twice president of The Electrochemical Society. During his active career he was a consulting chemist of the Federal Bureau of Mines, a fellow of the American Academy of Arts and Sciences, president of the American Chemical Society and of the American Physical Society. He was a member of the American Electroplaters' Society, the National Academy of Science, and the American Philosophical Society.

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